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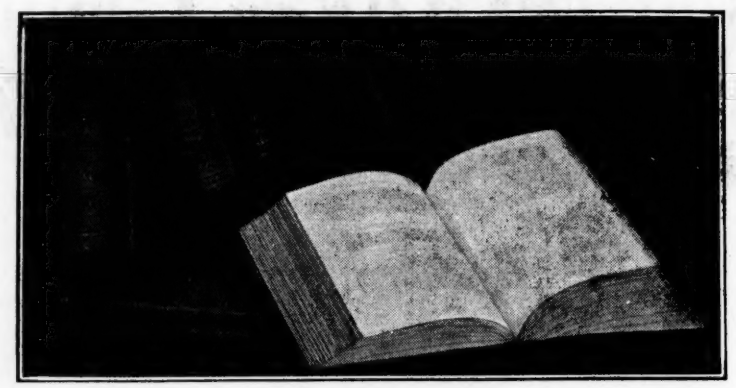

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## Remarks
ON

# POSTURAL OR SO-CALLED STATIC DEFORMITIES.

BY

A. S. BLUNDELL BANKART, M.CH.CANTAB., F.R.C.S.ENG.,

ORTHOPAEDIC SURGEON, MIDDLESEX HOSPITAL; SURGEON, ROYAL NATIONAL ORTHOPAEDIC HOSPITAL AND HOSPITAL FOR EPILEPSY AND PARALYSIS, MAIDA VALE.

## I.

STATIC deformities have been defined as those which are due in the main to the action of gravity. But, as everyone is subject to the action of gravity, it is clear that this is not enough in itself to account for deformity in an otherwise normal person. It would be more correct to say that static deformities are due to default of the normal mechanism for counteracting the influence of gravity and maintaining the body in the upright position. This mechanism is a nervous mechanism, for it has been shown by Sherrington[1] that the upright attitude or posture of the body is maintained by continuous reflex muscular activity (postural activity). For this reason I prefer to speak of these deformities as postural rather than static. The word static implies something almost wholly mechanical, whereas I believe that many of these deformities are really nervous in origin.

I must say, however, that by postural deformity is meant not merely a faulty posture as such, but also the deformity that may develop from it. This is important, because many writers have tried to draw a distinction between postural deformity and structural deformity, holding that a deformity is no longer postural when structural changes have taken place in it. Such a distinction is wholly artificial and misleading. A rachitic deformity is still a rachitic deformity after the active rickets has subsided. A paralytic deformity is a paralytic deformity even though the paralysis has recovered. Similarly, a postural deformity is one that begins as a faulty posture and passes through all degrees up to severe structural alteration.

### GENERAL CONSIDERATIONS.

In the skeletal muscles we meet with two kinds of muscular activity. The one is phasic—quick and transitory and concerned with the execution of *movement*; the other is tonic—relatively slow and prolonged and concerned with the maintenance of *posture*. These two kinds of activity are quite distinct. Indeed, in certain invertebrates there are separate muscles, differing in structure and in appearance, for the execution of movement and for the maintenance of posture respectively. In vertebrates the same muscle is utilized for both purposes, but there is reason to believe that different parts of the muscle fibres are concerned in these two functions. It has been suggested by Bottazzi[2] and others that the sarcostyles constitute the contractile or movement mechanism, and the sarcoplasm the tonic or posture mechanism. Further, there is some evidence that these two mechanisms have independent nerve supplies, and that the sympathetic may be concerned in the tonic or postural contraction of voluntary muscle. Perroncito[3] and Boeke[4] have described accessory (sympathetic) nerve endings in voluntary muscles. These consist of fine non-medullated nerve fibres connected with the perivascular sympathetic nerve plexus and terminating in the sarcoplasm independently of the motor end plate. De Boer[5] was able to abolish the tonus or postural contraction in the hind limbs of the frog and cat by section of the rami communicantes of the sympathetic.

This question is not yet settled, but it is particularly interesting in view of the close similarity between postural contraction in skeletal muscle and contraction in the smooth unstriated muscle of the hollow viscera and blood vessels. Indeed, Sherrington maintains that postural activity is the mechanism whereby these hollow viscera (stomach, bladder, etc.) and blood vessels normally adapt themselves to variations in the volume of their contents.

In the skeletal system postural activity occurs only in the antigravity muscles—that is, those which constantly resist and counteract the influence of gravity. This does not mean that no other muscles under any circumstances are capable of acting posturally, but that the normal postural or standing reflex involves contraction of the antigravity muscles only, their antagonists being inhibited.

Sherrington pointed out that the failure of many of the earlier experimenters to demonstrate tonus in skeletal muscle was due to their failure to appreciate this fact. Many of the observations were made on the gastrocnemius of the frog, which is an extensor muscle. But the habitual posture of the frog is squatting, not standing, and in this attitude the hind limbs are folded in nearly full flexion. Accordingly, reflex postural activity is found in the *flexor* muscles of the hind limbs of the frog, and not in the extensors. In Brondgeest's classical experiment demonstrating reflex tonus in the hind limbs of the frog it was the flexor muscles which exhibited the tonus. On the other hand, in the cat, dog, and monkey (and man), it is the extensors which exhibit the tonus or postural activity.

Postural activity in man is essentially a continuous act of extension—extension of the head and neck, the spine, the hips, and the knees—with adduction and inversion of the feet.

The chief characteristics of postural activity as summarized by Sherrington are: (1) the low degree of tension it usually develops; (2) the long periods for which it can be maintained without fatigue; (3) the difficulty of obtaining by artificial—for example, electrical—stimulation reflex contraction at all closely resembling the postural contraction produced by natural stimuli; (4) the relative ease with which reflex inhibition interrupts the postural contraction; and (5) and (6) the "lengthening" and "shortening" reactions obtainable from muscles exhibiting postural contraction.

The tension developed is usually quite mild, but it may be considerable. Usually it is just enough to maintain ordinary postures, and when greater tension than that is required it is obtained by the same kind of contraction as that employed for movements. But this latter kind of contraction cannot be long maintained owing to fatigue.

A remarkable feature of postural activity is its insusceptibility to fatigue. It is well known that phasic or voluntary muscular contraction cannot be maintained for long owing to fatigue. But postural activity can be maintained for long periods—hours or even days—without appreciable signs of fatigue. It has been shown that the energy-cost of a posturally acting muscle is extraordinarily low as compared with voluntary contraction. Indeed, the contrast is so striking as to suggest that these two forms of muscular activity are fundamentally different.

But perhaps the most characteristic feature of postural activity is what Sherrington[6] has called the "lengthening" and the "shortening" reactions. By this is meant the property which a postural muscle has of adapting itself to different lengths without change of tension. The lengthening and shortening reactions are best seen in cases of decerebrate rigidity, in which postural activity is free from the control of the higher centres. For example, if the extended knee be passively flexed, the limb remains fixed in the position to which it was moved. By this movement the quadriceps muscle is, of course, lengthened. But there is no increase of tension on the muscle. For, if the tension is measured by the weight which the muscle will just counteract, it is found that the weight is exactly the same whether the muscle is in the longer or the shorter state. In other words, the quadriceps adapts itself to and maintains the increased length with exactly the same tension that it possessed before it was lengthened. Similarly, when the flexed knee is extended the quadriceps adapts itself to the shorter length without change of tension. And in whatever way changes of posture are brought about—whether passively or by reflex or by voluntary muscular actions—these lengthening and shortening reactions are appended to the phasic contractions, so that different postures are maintained with the minimum expenditure of energy.

The afferent impulses which give rise to the postural reflex originate in the posturally acting muscles themselves—that is, it is a proprioceptive reflex, and the principal nerve centres concerned are situated in the paracerebellar nuclei. The higher parts of the brain, though not essential to the crude postural reflex, yet normally

exert a reinforcing and modifying influence upon it. In this way posture is influenced by the labyrinths, the cerebellum and the cortex cerebri.

Postural activity is acquired in early life. A newborn child cannot hold up its head, still less can it support its body in the upright position. This is not because the muscles are too weak, but because the nervous mechanism for these actions is not yet developed. In due course, by constantly repeated voluntary effort, the child learns to hold up its head, then to sit, to stand, and finally to walk. The upright attitude thus acquired laboriously by voluntary effort, then becomes habitual and subconscious, and is maintained by reflex tonic muscular activity (postural activity).

When the child begins to stand, the feet are flattened and everted by the body weight; this, again, is not because the muscles are weak, but because postural activity is not yet fully developed. When the child learns to walk, postural activity becomes established, and the feet are adducted and inverted—that is, the tendency to passive abduction and eversion is from that time onwards constantly resisted by reflex tonic muscular activity (postural activity).

Postural activity, then, being the normal mechanism by which the upright position of the body (including the normal attitude of the feet) is maintained, it is to postural activity and its modifications that we should first turn for an explanation when we meet with abnormal departures from the upright position.

## SCOLIOSIS.

One of the commonest "static" deformities is scoliosis or lateral curvature of the spine, and gravity is, no doubt, an important factor in its development. The influence of gravity on an initial curve of the spine is to tend to increase it and to bring about those rotatory changes in the vertebrae which are so characteristic a feature of the established deformity.

But gravity by itself is responsible for scoliosis to a limited extent only. In its purest form gravity scoliosis is seen in those cases which arise directly as the result of some occupation, such as carrying heavy weights on one shoulder. In such cases a moderate amount of scoliosis may develop very slowly in the course of years. It is a true adaptation deformity. It cannot be corrected, and it shows little tendency to increase spontaneously.

When the bones are softened by disease the force of gravity may produce severe deformity, as is seen in rachitic scoliosis, though it may be noted that in rickets loss of tone is as marked a feature as bone softening. Again, when the spinal muscles are paralysed, gravity produces deformity, but in this case for a long time the structural changes are slight compared with the extent of the curvature. It is true that severe fixed deformity often occurs in paralytic cases, but, if such a case is compared with a case of postural scoliosis of the same degree, it is remarkable how flexible the paralytic deformity remains, and to what an extent it can be corrected, at least for a very considerable time.

The commonest variety of scoliosis—namely, postural scoliosis—differs in origin, course and development from all these other varieties. It is essentially a progressive deformity, and its progress is often rapid and out of all proportion to the mechanical factors involved.

It has been customary to include in the etiology of this deformity all sorts of conditions which may cause more or less constant curves in the spine. Thus, scoliosis has been attributed to faulty attitudes assumed by children at school, to inequality in the length of the lower extremities, to weak muscles, etc. But nearly every child sits with a crooked back when writing at a desk or table, yet few develop scoliosis. Boys sit just as badly as girls—or worse, yet scoliosis is far less common in boys than in girls. Inequality in the length of the lower extremities is much more common without scoliosis than with it. We all know many cases of short leg from one cause or another, in which there is a constant curve in the spine on standing, but they have not developed scoliosis. Some such cases, it is true, develop a certain amount of curvature which hardly alters at all in the course of many years. It is an adaptation deformity and quite different from the ordinary postural scoliosis.

General debility and muscular weakness is so common apart from scoliosis that it cannot alone be considered as a cause of the deformity. In cases of actual paralysis of the spinal muscles—which may be taken as the extreme of muscular weakness—the deformity is almost entirely mechanical, and it differs in many ways from postural scoliosis. There is no greater mistake than to suppose that scoliosis is a deformity of weedy girls who are not strong enough to hold themselves up. Most of the cases seen in practice are of quite average muscular development.

It has been said that the ultimate cause of scoliosis is "spinal insufficiency"—one of those clever-sounding phrases which seem to mean a great deal, but which really mean nothing at all. Those who use the expression say that spinal insufficiency is a want of proportion between the weight which the spine has to carry and the "resistance" or carrying power of the spine. They do not say what the resistance is, nor in what way it is "insufficient."

Now, we have seen that the upright position of the body is maintained by continuous reflex muscular activity; that this postural activity is of a special kind, capable of being sustained for long periods without fatigue; and that it is controlled by a special nervous mechanism of its own. A faulty posture therefore suggests, in the first place, a faulty nervous mechanism or an abnormal nervous influence brought to bear upon that mechanism.

It has been mentioned that the labyrinths normally influence postural activity. The natural stimulation of the labyrinths arises from their position in space, and it has been shown experimentally by Magnus and de Kleijn[7] that postural activity is influenced reflexly by the position in which the head is held. When the head is bent forwards postural activity is inhibited, not only in the extensor muscles of the head and neck, but throughout the length of the spine and in the lower extremities. Conversely, when the head is extended, postural activity is increased. In lateral flexion there is a corresponding adjustment of postural activity on the two sides.

These observations forcibly recall certain attitudes frequently associated with deformities, as, for example, the bent head familiar in cases of adenoids, myopia, neurasthenia, paralysis agitans, old age, and other conditions which are often accompanied by kyphosis. When the head is held erect the spine is usually straight and the lumbar lordosis well developed. Lateral flexion of the head may, I think, find a place in the etiology of scoliosis, either as a contributory causative factor or as determining the localization of the principal curvature.

The cerebral cortex exerts a modifying influence on postural activity, either directly or through the medium of the cerebellum. The hypotonia of cerebellar deficiency and the characteristic posture assumed in some cases of cerebellar disease are familiar to neurologists. It is an everyday observation that, other things being equal, the upright figure and the bent figure reflect two very different types of *mind*. The difference between the attitude of a street loafer and that of a trained soldier is not merely physical—it is far more mental. In the "setting up" of a raw recruit discipline, drilling, and so-called physical exercises, produce a mental change. By their means a habit is formed, at first conscious and with effort, but finally subconscious and ingrained.

These are variations of posture within normal limits. But I would put forward the view that abnormal postures also are primarily nervous or mental in origin—that postural scoliosis, in fact, originates as a functional nervous disorder. Mental fatigue or inertia—in fact, neurasthenia—leads to deficient postural activity, even though the muscles are well developed and voluntary muscular power is unimpaired. When postural activity is deficient the erect posture is imperfectly maintained, and under the influence of gravity the spine or part of it becomes curved. At first the spine can be straightened by voluntary effort, but, as we have seen, this form of activity cannot be sustained on account of fatigue. Postural activity is essential for sustained muscular action.

The dissociation of phasic and tonic or postural muscular activity is seen in an aggravated form in certain nervous diseases, as, for example, in myasthenia gravis. In this condition the patient is able to perform a voluntary movement, but the tonic or postural activity is absent from the affected muscles, so that the attitude assumed by the voluntary contraction cannot be sustained. Thus, the patient can raise the eyelids voluntarily, but cannot keep

them raised. The muscles voluntarily contracted rapidly tire, and the movement can only be repeated after an interval for their recovery. Normally, a postural contraction would be appended to the voluntary contraction, and the patient would be able to keep the eyes open without effort or fatigue.

The same phenomenon can be demonstrated by electrical (faradic) stimulation of the muscles, and gives rise to a characteristic reaction—the myasthenic reaction. If the muscle is stimulated repeatedly at short intervals with the faradic current, it gives at first a brisk response, but the succeeding contractions become weaker and weaker until at last no response is obtained with the strongest current. Or, if the faradic current is applied continuously, the muscle at first gives a brisk contraction which gradually fades away and disappears, although the current is still passing. After a short interval the muscle recovers its excitability, which, however, again disappears on repeated or continuous faradic stimulation. The galvanic reactions of the muscles are not affected.

I have found the myasthenic reaction to be present in cases of postural scoliosis. Naturally, one would not expect it to be so well marked as it is in myasthenia gravis, though in that condition it is, as a matter of fact, variable. But it has been demonstrable in many cases which I have examined for it, and I think it clearly indicates that deficient postural activity, and not muscular weakness, is the immediate underlying cause of postural scoliosis.

The frequent association of scoliosis with neurasthenia, and with a neuropathic family history, was noted twenty years ago by Oppenheim,[8] and I have frequently noted the same among my own patients. Again and again I have seen scoliosis coming on apparently without cause in girls who were perfectly well developed, who went to good schools, and who lived apparently in the best conditions. Sometimes in such cases one would obtain a history of overwork — particularly, working for an examination. Sometimes a neurotic tendency or peculiar temperament would be noted in the patient herself. But most common of all, I think, is a history of neurosis of some sort or other in the parents or their immediate relatives. I have convinced myself that the mental condition is of the greatest significance in these patients—often far more so than the physical aspect of the deformity.

But while the functional origin of scoliosis may thus be accounted for, the development of the deformity requires further consideration. Gravity, no doubt, plays a part, but, as I have already said, the progress and fixation of postural scoliosis is often rapid and out of all proportion to the mechanical factors involved. The early fixation of a postural curvature is due to contracture of the soft parts in relation to the vertebrae, and I would suggest that this, in the first place, is of the nature of a functional contracture.

Some light may be thrown on the question of functional contracture by considering the occurrence of contracture in paralysed muscles and in their non-paralysed antagonists respectively. Structural fixation, as has been said, occurs slowly in paralytic as compared with postural scoliosis, and this is in accord with our experience of paralytic and non-paralytic contractures generally. In a case of drop-foot, when all the muscles of the leg are paralysed, shortening of the calf muscles occurs slowly, and for some time after it has begun it can easily be corrected by simply stretching the contracted muscles. But, in a case of drop-foot in which only the dorsiflexor muscles are paralysed, contracture occurs with great rapidity if the foot is not supported, and it firmly resists correction by mechanical means.

The two processes are quite distinct. Contracture in a paralysed muscle is due to loss of elasticity consequent on fibrosis in the degenerating muscle. In the case of non-paralysed muscle, physiologists are generally agreed that lengthening is as much an active process as shortening or contraction. When a muscle has contracted in response to a nervous impulse it requires another nervous impulse to initiate the process of lengthening. The natural impulse for lengthening a muscle is the direct outcome of the impulse for causing contraction of its antagonist. Therefore a break in the arc of reciprocal innervation has a twofold effect. Not only is the paralysed muscle unable to receive impulses to make it contract, but its non-paralysed antagonist is unable to receive the impulses necessary to make it lengthen. The latter, therefore, having once shortened, remains shortened, and very soon its power of elongation is permanently lost.

In postural scoliosis we have a condition in which postural activity is deficient. The spine is curved to one side, and the law of reciprocal innervation holds good for the erector spinae muscles on either side of the curvature. In order to straighten the spine, the muscles on the convex side must be made to shorten, while at the same time those on the concave side must be made to lengthen. In early cases this can be done to some extent by voluntary action, but, as we have seen, this is quite different from postural activity. The nervous impulses necessary to bring about postural readjustment are not forthcoming. The muscles on the concave side, therefore, remain shortened, and, just as in the case of the non-paralysed antagonists of paralysed muscles, their power of elongation is soon permanently lost. The analogy holds good except for the fact that in the paralytic case the faulty innervation is due to an organic lesion, whereas in postural scoliosis it is functional—that is to say, the brain is unable to initiate the process of postural readjustment.

I would suggest that progressive functional contracture on the concave side of the curvature is the cause of the rapid fixation which occurs in so many cases of postural scoliosis. One is tempted further to speculate whether the structural changes both in the soft parts and in the bones are in any way connected with the sympathetic innervation of these parts. During recent years we have become so familiar with physical effects of functional nervous disorders—for example, cold and blue limbs, congestion, sweating, oedema, atrophy, contracture, periarticular fibrosis, etc.—effects which are nutritional and therefore under control of the sympathetic, that it is no longer justifiable to assume, as once was done, that because a change is structural, therefore it cannot be functional in origin. I shall, however, return to this question in the second part of this article.

### Treatment of Scoliosis.

If the foregoing inferences are correct it is obvious that they must have an important bearing on the treatment of scoliosis. How often does one see scoliosis appraised and treated almost entirely from behind the patient's back! If you want to know whether a patient has got scoliosis, look at her back. If you want to know why she has got it, and how to treat it, look at her *face*. The face is said to be the mirror of the mind, and you will find there and in her neurological history information of at least equal importance to any that can be obtained from examination of the back.

The principal cause of deficient postural activity is mental fatigue or inertia. Temperament, environment, occupation, and the general state of health are important factors. The child who sits badly at school and develops scoliosis is the child not with weak muscles, but with the overtaxed brain. It may be remarked that this depends more on the mental capacity of the individual than on the actual amount of work done. A clever child may be tempted to compete with older children, while a dull child may be overworked in merely trying to reach an average or a low standard. In such cases it is useless merely to introduce a course of exercises into the ordinary school routine. Either the routine should be radically altered or the child should be taken away from school.

Patients with scoliosis can be divided roughly into three classes—(1) an active type, apparently active in mind and body, and generally well developed; (2) a listless apathetic type, disinclined for exertion, poorly developed or flabby, and lacking interest in her surroundings; and (3) an obstinate type—lazy, careless of appearances, and difficult to influence. Each of these requires different treatment. The active type requires rest or at least curtailment of excessive activity—usually mental; the apathetic type requires stimulation, persuasion and re-education; the obstinate type requires vigorous stimulation, discipline and work.

It need hardly be said that the patient's general condition should be treated. As in neurasthenia generally, change of environment and occupation is often the ideal, but is not often attainable. Anaemia, constipation, adenoids, etc., should be treated if necessary. Strychnine augments the postural reflex, and is the basis of most "tonics," so it may often be given with benefit.

With regard to so-called physical exercises, postural scoliosis is due, not to muscular weakness, but to deficiency of the habitual subconscious state of reflex activity which normally maintains the upright attitude. The object of treatment, therefore, is not to strengthen or develop particular muscles or groups of muscles, but to redevelop a habit—the postural reflex. This may be done now in the same way as originally in early childhood—namely, by voluntary muscular effort constantly repeated until it becomes involuntary, subconscious and habitual—in other words, by exercises.

Exercises are only one of the means to this end. They should be designed to correct faulty postures as such, and not with the idea of developing particular muscles. Intermittent exercises are of little use in themselves. The patient must be got to strive for a constant effect. Her co-operation is essential, and to this end the personality of her instructor is of far more importance than the particular exercises done.

Restoration of the postural reflex is the basis of all curative treatment of scoliosis. If a curvature is flexible, so that it can be straightened by active or passive movement, it will be kept straight when the postural reflex is re-established, and the patient will be cured.

A curvature that is partly fixed by structural changes can be corrected only so far as it can be made flexible. The flexibility of a structural curve can often be materially increased by active and passive corrective movements, but rarely, if ever, can a structural curve be made completely flexible and therefore curable by these means. A moderate amount of fixed residual curvature may be held in check indefinitely, if the postural reflex is re-established. Such a curve, however, tends slowly to increase mechanically under the influence of gravity, just as an occupational or adaptation curvature does, and many such cases eventually show a poor return for the time, labour, and money that has been expended on their active treatment. Therefore, if a curvature is not held in check by a reasonable amount of active treatment, it should be given mechanical support.

With regard to forcible correction and the application of plaster jackets in scoliosis, it is known that, apart from its effect on the distortion of the ribs, this method, like others, depends for its success upon flexibility of the spine. Most orthopaedic surgeons will agree with the finding of the Scoliosis Committee of the American Orthopaedic Association (1916) that no case of fixed scoliosis has yet been shown to have been corrected in the anatomical sense by any method. At best, forcible correction is but a preliminary measure, and if it is not followed by restoration of the postural reflex or by efficient mechanical support, it is both useless and harmful.

The day has passed when it was customary to hang a so-called spinal support on every crooked back. Nearly everyone now treats scoliosis by exercises, and I think that exercises are indicated in the majority of cases. But I would plead for discrimination in their use, as in that of any other therapeutic measure. Some people have made almost a fetish of exercises. One sees cases so treated, literally for years, without any appreciable benefit, and a spinal support is often ordered only as a last resort. Some cases are quite unsuitable for treatment by exercises from the beginning. Exercises in many cases are given without appreciation of their real purpose. They are only one of the means to an end—namely, restoration of the postural reflex, and to attain this end it is the patient, and not merely her spinal column, that requires treatment.


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(*To be continued.*)

THE Department of Social Hygiene in the League of Red Cross Societies, whose headquarters are at Geneva, will in future be known as the Department for Combating Venereal Diseases. Mr. Walter Clarke has been appointed Chief of this Department and Lieut.-Colonel Ritchie, Assistant Chief. The League has published in English, French, German, Italian, and Spanish two pamphlets concerning the fight against venereal diseases, entitled respectively "The venereal diseases survey" and "Venereal diseases—a challenge to the Red Cross."

# Oliver-Sharpey Lectures

ON

# THE NATURE OF FLUTTER AND FIBRILLATION OF THE AURICLE.


BY

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## LECTURE II.—AURICULAR FIBRILLATION.*

IN the first of these lectures I have endeavoured to put before you the chief conclusions which we are able to form respecting that rather rare condition auricular flutter, and have stated that flutter as it occurs in man is due to a single wave circulating continuously. In this lecture I propose to deal with the much commoner and therefore more important disorder, auricular fibrillation. Now these two conditions are very closely related, as has been recognized for some years; they are known to be related, not only because of several resemblances, but because the one not infrequently passes into the other. Thus flutter of the auricle, as I pointed out some years ago, may usually be converted into fibrillation by the administration of heavy doses of digitalis; a conversion which is made use of in the present-day therapy of flutter. We shall see presently how the two states are related, and that circus movement underlies both. To explain the interrelation it is necessary for me to expand what I have already touched upon—namely, certain reactions of the auricular muscle to increased rate of beating. We must study in more detail the change which occurs in the length of the refractory period and in the rate at which the waves trave, as the rate of beating rises.

### INFLUENCE OF HEART RATE ON THE REFRACTORY PHASE, ETC.

The changes are somewhat complex, and may be illustrated most clearly by means of the accompanying diagram (Fig. I). To the left of the diagram is a double-headed arrow, which represents the length of the auricular cycle when the heart is beating at a normal rate. This cycle is divisible into two parts, as indicated by the two double headed arrows which stand just to the right of the first; it is divisible into the *refractory period*, during which the auricular muscle is in the excited or contracted state, and into the *responsive period*, during which the muscle is inactive or resting. I represent the refractory period in black and the responsive period in white, and the remainder of the diagram shows, on the basis of direct observation, how these two periods are proportioned to each other as the heart rate is raised. As the heart rate rises by equal increments—say from 100 to 150 to 200 to 250, etc.,—so the length of the cycle shortens. If the lengths of the cycles, as these shorten, are charted vertically upon a horizontal base line (as in the figure), their ends join up to form a curve, the steepness of which gradually decreases. The curve of the end of the cycle approaches the base line, at first rapidly, but gradually less rapidly. The two lines will meet at infinity. The end of the refractory period also forms a curve which moves towards the base line (it is represented by the top edge of the black portion of the figure). Briefly, the refractory period of the muscle shortens as does the length of the contraction when the heart rate is raised. But the refractory period does not shorten to the same extent as does the length of the cycle; consequently the *responsive period* dwindles when the rate is advanced. It dwindles until, eventually and at a very high rate of beating, it disappears altogether. When this happens the muscle will not respond to every impulse reaching it; it breaks into what has been termed 2 : 1 (or half) response—that is to say, it responds only to alternate impulses entering it. That is but natural, seeing that only alternate impulses will fall during the responsive period of preceding cycles.

Now the precise manner in which this alternating response is foreshadowed in the mammalian auricle is

* Delivered before the Royal College of Physicians of London, April 14th, 1921.

peculiar, and considerably important; it is necessary thoroughly to understand it. As the rate of beating rises, and the period of responsiveness shortens, a time comes when the muscle develops what is spoken of as a *partially refractory period*. It is a phase of the cycle, during which the muscle as a whole *may or may not* respond to stimulation. When this partially refractory phase first develops the cycle seems to be divisible into three parts: at the beginning is the absolutely refractory phase; this is succeeded by a partially refractory phase; a short phase remains at the very end of the cycle, during which the muscle is always responsive to stimulation. But the end of the partially refractory phase is not sharply defined; it fades imperceptibly into the phase of responsiveness. If you will, the matter may be expressed somewhat differently. During the early and greater part of the cycle the muscle is quite refractory, but the end of this phase is no longer clean cut and determinate; if at one instant the muscle is wholly refractory, at the next instant it is not wholly responsive; the refractoriness fades away gradually (through the partially refractory period) and responsiveness gradually develops. The state of refractoriness is found to be denser as it is traced backwards through the cycle until at last it becomes absolute. The development of the partially refractory phase, which is a phenomenon of high rates of beating, expedites the closure of the gap between the end of the absolute refractory period and the end of the cycle. The precise instant at which the state of partial refractoriness ends is not measurable, but it is certain that, as the rate of beating advances, it soon bridges the gap completely. When this stage is reached the cycle is divisible into two—namely, a phase of absolute refractoriness and a phase of partial refractoriness; there is no true or wholly responsive phase. This state of the muscle is represented in a small diagram above the main figure.

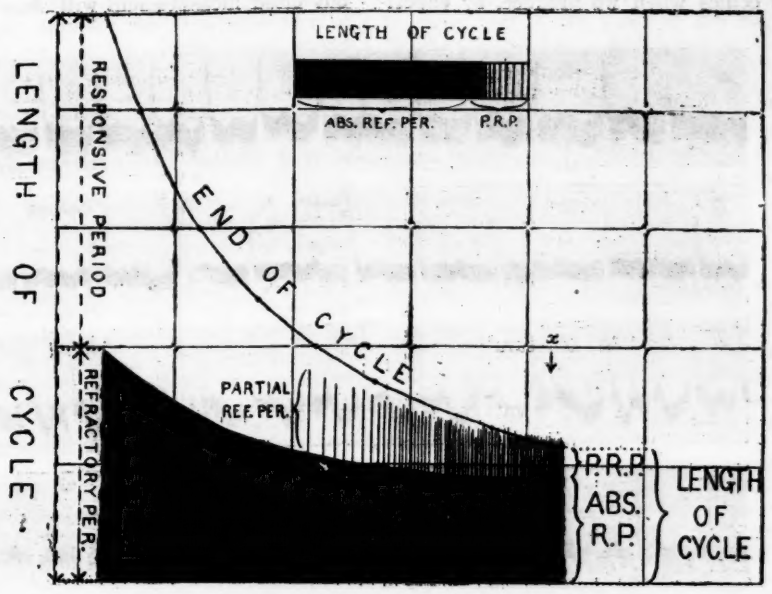


FIG. I.—The main diagram illustrates the relation of the refractory period to the length of the cycles when the auricular rate is raised by equal increments from its normal rate to a high level. The black portion of the diagram represents the absolute refractory period, which shortens as the rate is raised (that is, reading from left to right); a curved line indicates the shortening of the cycle itself. *P.R.P.*= period of partial refractoriness. *ABS. R.P.*=period of absolute refractoriness.

The meaning of the change which I have described is not obscure; it is this: when the rate is sufficiently raised, the muscle fibres do not all contract during each cycle, some contract in alternate cycles only, and the critical rate at which regular response fails is not the same for all the muscle fibres; some fail to respond earlier than do others. During the phase of absolute refractoriness all the fibres are refractory to stimulation, during the remainder of the cycle the fibres one after another recover their excitability, the muscle as a whole becomes more and more responsive therefore, but up to the very end of the cycle some fibres still remain refractory.

I have dealt with this question of partial refractoriness at some length because it is essential that it be comprehended fully and clearly. It is a phenomenon which has fundamental influences upon the action of the auricle beating at very advanced rates. What I especially desire to emphasize is that, at these advanced rates of beating, each excitation wave entering the muscle finds that muscle imperfectly recovered from the passage of its predecessor.

Let us apply the small diagram in the upper part of Fig. I to our picture of a circulating wave. In the diagrams of the ring experiment shown in the last lecture I represented the circulating wave in its most simple form. The relations there shown between the advancing crest of the wave and its wake of retreat represent what is occasionally found in actual experiment. More usually, however, the relation in flutter is a little more complex. The gap between the crest and wake does not consist of wholly responsive but of partially refractory muscle (see Fig. II). The on-moving crest encounters many fibres which are responsive; it finds some which are still refractory. These refractory fibres form minute barriers to its progress; it wends its way from side to side, passing only where it finds channels open and ready to receive it. It is as though a second prairie fire followed a first, but followed it at a time when the vegetation formerly burnt had not fully returned to its old condition; there would be places where the cinders of the first fire still blackened the earth, and the second flame in passing would creep around the edge of these before it could go forward. These barriers, by deflecting it, render the onrushing wave sinuous in its course, and delay its progress from point to point.

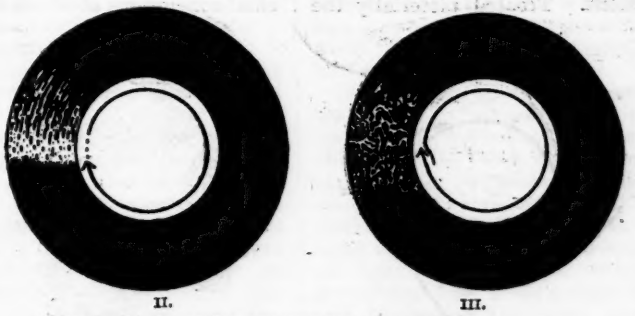


FIG. II.—A schematic representation of the excitation wave as it circulates in flutter. The blackened portions of the ring represent those portions of the muscle which are refractory at a given instant. The crest of the wave travels constantly through muscle in a partially refractory state. The border of the advancing wave is finely serrated.

FIG. III.—A similar representation of the excitation wave as it circulates in fibrillation. The advancing border and retreating wake are deeply crenated, and these crenations overlap. The wave is constantly advancing through small and irregular channels of responsive tissue as these open up to receive it.

I said in my first lecture that in flutter the rate at which the wave is transmitted is not usually normal, but that it is slower than normal. We have proof that this delay is not due to change in the rate of fibre conduction, but to small barriers of unrecovered (or refractory) fibres. This observation is one of no little consequence, since it much simplifies our conception of those factors which are responsible for the maintenance of circulating waves. These factors are three—namely, the length of the muscle path, the rate of propagation from point to point, and the duration of the effective refractory period. We now see that the second factor is controlled by the third. In large measure the length of the path is also controlled by the refractory phase; for, where several channels are open to the crest of the circulating wave it will take the shortest, and that is the path along which it most closely follows its own wake.

In studies of flutter, and in those of fibrillation, refractory period becomes of prime importance. Its length, and especially the length and character of its partial phase, are responsible not only for the maintenance of circulating waves, but, as we shall see, for the particular form of disordered movement which the auricle assumes.

### THE PRODUCTION OF EXPERIMENTAL FIBRILLATION.

It has been stated previously that a frequent first step towards knowledge comes when we produce, by experimenting upon animals, a condition identical with that seen in our patients. In so far as fibrillation of the auricle is concerned that step was taken eleven years ago. At that time a condition termed fibrillation of the auricles was well known to experimenters, and a common form of disordered heart action was recognized in patients; but neither the experimental nor the clinical condition had been examined sufficiently closely to make it clear that the two states are one and the same. This identity was proved when the electrocardiograms of the experimental and clinical conditions were submitted to close comparison by Rothberger and Winterberg and myself in 1909, and when a little later I sought and obtained the opportunity of exposing to view the heart of a horse suffering from the same malady as do our patients.

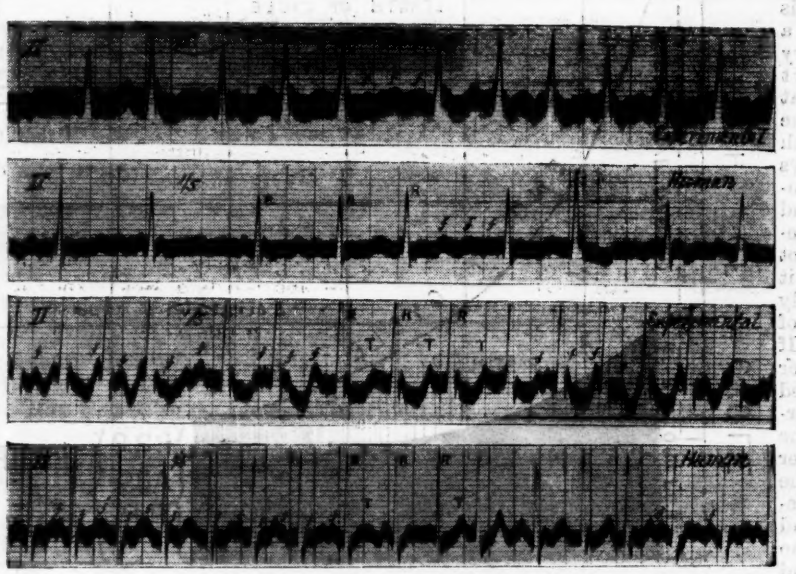

FIG. IV.—Four electrocardiograms (lead *II*) illustrating fibrillation of the auricles in man and the dog. The first and third curves are from dogs, and have been taken from recent experiments in which fibrillation of the auricles has been analysed. These two curves should be compared with the second and fourth respectively; these last are examples of clinical fibrillation. *R* and *T* are ventricular deflections; *f* are the oscillations arising from the fibrillating auricles.

Since the time of these demonstrations the term fibrillation of the auricle has come to be used universally in describing this particular disorder of the human heart. In Fig. IV I show again electrocardiograms of the experimental and clinical conditions. Treated pictorially the curves of auricular fibrillations are, within certain limits, variable; but exactly comparable variations are to be seen in man and animal. The variability of the picture is in large part governed by the action of the ventricles. As you are aware, the rate of the ventricular action is not always the same, neither is the degree of its irregularity in different samples of fibrillation. It is not difficult to choose from a collection of clinical curves on the one hand and experimental curves on the other hand, examples in which the resemblance is so close as to be convincing. With the details of the curves I need not now detain you, but would remind you of their most constant features. The ventricular representatives (*R* and *T*) are frequent and irregularly placed; the auricular representatives comprise a series of oscillations, of irregular form and somewhat irregular incidence and amplitude. The auricular representatives in flutter are united end to end; the action is quite regular and continuous, and its mean rate is approximately 300 per minute. The auricular representatives in fibrillation are not very dissimilar to these; they are also joined end to end; and the action is again continuous. The auricular action in flutter and fibrillation differs, however, in important respects; thus, in fibrillation it is 50 per cent. faster, the oscillations having a mean rate of about 450 per minute; another difference is that in fibrillation the cycles are not accurately repeated; sometimes over short stretches of curve there may be at least a suggestion of repetition (as in the last record of Fig. IV), but close measurement will show that it is not precise; moreover, it is not long maintained. Change is the rule.

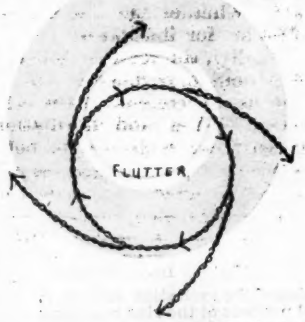


FIG. V.—A diagram illustrating the successive paths followed by the excitation wave in flutter. The path is finely sinuous, but is in general accurately repeated from cycle to cycle.

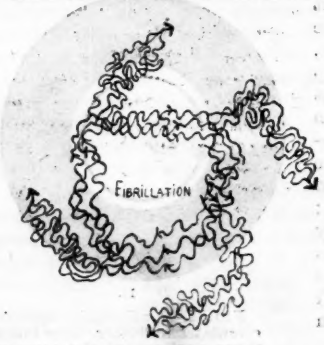


FIG. VI.—A similar diagram of the successive paths taken in fibrillation. The path is coarsely sinuous and ever-varying, though it continues to progress in a clockwise fashion around a central area.

### THE NATURE OF FIBRILLATION AND ITS RELATION TO FLUTTER.

I have pointed out that the first step in this inquiry was taken eleven years ago, when it was ascertained that the clinical disorder is identical with one which can be produced experimentally; but it is to be understood that we then obtained no close insight into fibrillation *qua* fibrillation. We had obtained knowledge of a disorder of the human heart, and, more important, the means of further investigating it. It is in respect of these further investigations that I shall now speak. The method of research has been very similar to that employed in the case of flutter. We produce fibrillation of the auricles in an animal by suitable stimulation, and proceed to examine the paths taken by the excitation waves through the muscle while this fibrillation continues. It would be impossible for me to place before you in this lecture the details of this analysis; I can only attempt to acquaint you with the chief conclusions at which we arrive after fully considering the evidence derived from all sources. The main conclusion is that fibrillation, like flutter, is maintained by a circulating wave. As in flutter, the central circulating wave is a single wave, but the circuit is completed in a shorter time; the auricular cycles, therefore, follow each other more quickly. To what is this quicker movement due ultimately? It is almost certainly due to the path of the circus movement being somewhat shorter than is the case in flutter. Why should the path be shorter? Probably because in auricles predisposed to fibrillation the effective refractory period is shorter than in those predisposed to flutter. The crest of the circulating wave in both conditions tends to follow close upon its own wake. The refractory muscle forms a ring broken by a small gap; this broken ring, regarded as a whole, revolves. Now the length of refractory *tissue* in this ring at any given instant is obviously controlled by the duration of the refractory *period*. A decrease in the refractory period shortens the length of the tissue involved in this

state at any given moment; consequently, if the gap remains unaltered, the diameter of the ring must shorten. If a snake glides along the path taken by its own tail, the size of the circle which it inscribes will be controlled by the length of the snake.

We believe that in fibrillation the circuit is smaller in diameter than in flutter. We cannot yet describe with confidence the precise paths which are followed; but there is some direct evidence to suggest that the mouth of the superior cava is one of the circuits which the central wave favours. Where precisely the circuit is situated is of little moment. To recognize that a single circuit exists should suffice.

The difference between fibrillation and flutter is in part one of rate; but that is not the sole difference or even the most important difference. It has been shown to be the rule that in flutter the crest of the circulating wave is constantly passing through tissue in a partially refractory state. The wave as it progresses strikes upon small barriers which render its course finely sinuous. In fibrillation this interference is much exaggerated; the barriers are larger and the crest travels along paths coarsely sinuous. Seemingly, the crest has not a straight or simply curved border of advance; it is deeply and irregularly crenated. Its wake is similarly crenated and the crenations of the one and the other overlap and intertwine; this relation is shown diagramatically in Fig. III. The crest of advance moves through muscle apparently in a denser state of partial refractoriness than is the case in flutter.

Picture the path travelled by the wave after it has circulated several times in flutter (Fig. V). There is the track of the central re-entering wave; the path taken is finely sinuous, but apart from these very minor variations it is constant. As this mother wave circulates in the main channel it throws off centrifugal waves at each revolution, and these proceed into outlying areas of the muscle, such as the appendices and the sleeves of muscle on the cavae; along these outlying channels the path is also finely sinuous, but in general constant. The whole muscle of the auricle is involved in each cycle. With each revolution the events are repeated; the waves are signalled with almost perfect regularity in every part of the musculature; at each revolution a wave passes to the region of the *A–V* node, the responses of the ventricle are, therefore, of an orderly character.

Picture similarly the path which the wave has followed after it has circulated several times in fibrillation (Fig. VI). Everywhere the track is coarsely sinuous. There are the central tracks, spread over a wider band of tissue than in flutter,* because the path varies. Speaking very broadly, the same central path is trodden over and over again, but in detail there is no constancy. The wave may, and apparently does, encircle the same central area repeatedly if not continuously, but it staggers along its course; it is a road of many and serious obstacles. For that reason it does not return to its starting point after constant intervals of time; for that reason and because of change in the actual path pursued, the oscillations in the electrocardiograms are of irregular incidence and form. The paths through the outlying muscle also vary. Place contacts on any region of the auricular muscle, and the waves are not signalled regularly as in flutter, but irregularly; a few even fail to arrive at their proper destinations. With each irregular revolution, or at least with most, a wave passes to the region of the *A–V* node.† These waves arrive at the node more frequently than they do in flutter, for the general movement is somewhat faster; but because the path travelled is coarsely sinuous and variable they arrive at the node irregularly. The responses of the ventricle are therefore irregular.

### THE ACTUAL CIRCUITS IN FLUTTER AND FIBRILLATION.

A single circulating wave is responsible both for flutter and for fibrillation of the auricle; in both conditions it follows the re-entrant path repeatedly, though in flutter this repetition is far more exact than it is in fibrillation. We possess some definite knowledge of the actual paths followed by the wave in the fluttering auricle of the dog. The wave may encircle the mouth of the superior cava and includes a variable amount of tissue lying between this vessel and the inferior cava; or it may encircle together the mouths of both superior and inferior venae cavae; it is probable, though it is not proven, that circuits are formed in some instances around the auriculo-ventricular orifices.

In man the rates in flutter are from 240 to 350 per minute; in the dog the rates are 345 to 580 per minute. In other words, the rates in the dog are approximately 50 per cent. faster. Difference in the size of the organ in man is sufficient to explain this difference of rate, if we assume the rate of transmission in the human and canine auricles to be equal. We may arrive at a general, if we cannot arrive at a precise, idea of the ring's circumference in the human subject. Thus, if the rate of a human flutter is 240 per minute, the duration of each cycle is 0.25 of a second; if the rate is 350 per minute, the duration of each cycle is 0.17 of a second. Assume that the transmission rate in flutter is 500 millimetres per second, then the length of the path will be 125 millimetres in the one case and 85 millimetres in the other, and the diameters of the corresponding circles will be 4 and 2.7 centimetres respectively. Thus, if our assumed transmission rate is correct, the circular paths in flutter are of diameters somewhat exceeding the diameters of the chief orifices of the auricle. It is these natural orifices to which we look especially in attempting to locate the actual paths of the waves.

In human fibrillation the rate of movement is faster; it lies usually in the neighbourhood of 450 per minute, the cycle having a duration of 0.13 of a second. If we assume the same transmission rate, then the length of the path would be 66 mm., and the diameter of the circle would be a little more than 2 cm. It will be evident that if this estimate is approximately correct, and if we suppose the chief orifices of the auricle to be those encircled by the waves in fibrillation, that in this last condition the encirclement must be a very close one. The factor which remains in doubt is, of course, the rate of transmission.

These remarks, Sir, bring me almost to the end of what I propose to record in the present lectures. I may have been tempted to speak of possible remedies for the state of affairs which I have described, but the subject is still unripe for discussion; perhaps I have said enough in indicating what seems to me one of the chief lines which investigation should take; it is an investigation of the refractory period of heart muscle, a search for remedies which will influence the duration of this refractory state, and which, by prolonging it, will help us to close the gap between the crest and wake of the circulating wave; for this gap is essential to the maintenance of the circulating wave, whether the circulating wave is responsible for flutter or for fibrillation.

[Finally, the lecturer proceeded to demonstrate shortly his recent experiments with Dr. Drury and Dr. Iliescu upon the movements of the electrical axis of the auricle in clinical flutter and fibrillation. If suitable planes are chosen it can be shown, in both these conditions, that the electrical axis changes its direction in a definite and striking manner; it revolves through 360° as each auricular cycle is completed. As the electrical axis may be taken as an index of the general direction in which the wave is travelling, these observations demonstrate that in flutter and fibrillation the wave travels in a circular fashion through the auricle. Taken in conjunction with the experimental evidence, they constitute proof of simple circus movements in the human auricle affected by these two disorders.]

*Note.*—Full references to the work on flutter and fibrillation will be found in the original papers published in *Heart*, vols. vii and viii.

* Though the band of tissue involved in successive circuits is wider, the average circle is probably of lesser diameter, as already stated. The shorter diameter is not represented in the accompanying diagram.

† The waves which reach the *A–V* node are approximately one-tenth less numerous than those which flow along the central path. In the average they number, therefore, about 400 per minute in human fibrillation.

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ON the occasion of the 25th anniversary of the discovery of the Roentgen rays a monument will be inaugurated at Petrograd to Professor Roentgen and a street will be named after him.

THE fifth meeting of the German Urological Society will be held at Vienna from September 29th to October 1st, when the following subjects will be discussed: (1) Pathology and treatment of hydronephrosis, (2) surgical anatomy of the bladder and ureters in relation to extensive resections.

# THE ETIOLOGY OF RICKETS:

## *AN EXPERIMENTAL INVESTIGATION.*

BY

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(*Abstract.*)

SINCE 1907 investigations upon experimental rickets in dogs have been carried on in this laboratory, first by Leonard Findlay,[1] then by Renton and Madge Robertson,[2] and subsequently by Noël Paton, Findlay, and Watson.[3]

These last experiments showed that while all the pups of two litters kept in the laboratory upon an abundant supply of whole milk and oatmeal porridge developed rickets, two pups from each of the litters kept in the country on skimmed milk and oatmeal remained free of the disease.

The present series of observations* shows that pups kept in the laboratory develop rickets even on an abundant supply of milk fat (as much as 7.5 or even 11 grams per kilo) and oatmeal porridge, but that those on the same amount of separated milk (0.2 to 0.7 gram of milk fat) and porridge develop the disease more rapidly. The energy value of the separated milk diet was necessarily lower than that of the full milk diet (207 to 267 calories as against 270 to 437 calories), and hence it is possible, as is suggested by the observations on infants by Hess and Unger,[4] that a low energy intake may predispose to the disease, although it is not a causal factor.

To test this the next experiment was arranged so that pups of three litters, which were available at the time, should have the diet increased proportionately to their increase in weight, and that the energy intake should be kept ample throughout the period of growth, but that, while one series of pups should have the energy supplied largely from whole milk—fresh and dried—with bread, another should have it from dried separated milk and bread, another from lard, which the Vitamin Committee[5] of the Medical Research Council class as a fat free of their anti-rachitic vitamin, and the last series from dried separated milk and bread. Scrupulous care as to cleanliness was observed throughout this experiment.

The result was that all the pups, with one exception, reached fifteen to eighteen weeks free of rickets, although those upon the separated milk and bread diet had only 0.3 to 0.6 gram of milk fat per kilogram per day.

The basis of Mellanby's[6] experimental work is that separated milk up to 250 to 350 c.cm. and white bread, even with linseed oil, yeast, and orange juice, will not prevent the onset of rickets in pups between six and twelve weeks of age, while whole milk will prevent it, and upon this is based the practical recommendation of the Vitamin Committee,[5] p. 99, that full cream milk should be used by children for the prevention of the disease.

Butter is placed with cod-liver oil (p. 102) as the substance richest in "fat-soluble A or anti-rachitic factor," but both of the two pups in our series to which butter was administered in large quantities developed rickets, while its administration failed to cure or to prevent the advance of the disease in another.

Our experience indicates that by attention to strict cleanliness it is possible to rear pups free from rickets in a laboratory. It is easy to rear them in the open air, even on a diet poor in milk fat. The work of Morpurgo on white rats, and the study of an epidemic of rickets among foxhounds in Adelaide by Bull,[7] taken along with our results, point to the probability that a bacterial infection of the same non-specific character as that which the investigations of McCarrison have shown to be the causal factor in goitre, plays an important part in the etiology of the disease.

A point of considerable interest demonstrated in our observations is the more rapid growth of the pups kept in the open air.

CONCLUSIONS.

1. In young dogs, under ordinary laboratory conditions, a liberal allowance of milk fat up to even 14 grams per kilo of body weight neither prevents the onset of rickets nor cures it when it has developed.
2. Pups kept largely in the open air may escape the development of rickets on an intake of less than 1 gram of milk fat per kilo body weight.
3. With scrupulous care as to cleanliness it is possible to rear pups free of rickets in the laboratory on an intake of only about 0.5 gram of milk fat per kilo of body weight, along with bread, provided that the diet affords an adequate supply of energy.
4. The energy value of the diet, however supplied, quite apart from the presence of any hypothetical anti-rachitic factor in milk fat, would seem to play a part in controlling the development of rickets, but that it is only a contributory part is shown by the development of rickets in pups with a high energy intake when they are confined in the laboratory without scrupulous care as to cleanliness.
5. Milk fat may be reduced to about 0.3 gram per kilo of body weight, if its place is taken by an equal amount of lard, without the onset of rickets.
6. The results of these observations do not support the conclusion of the Accessory Food Factors Committee of the Medical Research Council that rickets is a deficiency disease due to lack of an anti-rachitic factor associated with milk fat.

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* A detailed account of the experiments is published in the April number of the *British Journal of Experimental Pathology*. The expenses of the investigation were defrayed by the Medical Research Council.

# A TUBERCULOSIS IMMUNIZING VACCINE.

BY

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OF all the serious infections of the human body tuberculosis is the most hopeful, both as regards its prevention and also its cure, provided that treatment can be commenced early enough and continued long enough to give the affected tissues time for repair.

In spite of an enormous amount of research, continued in all parts of the world, we have reluctantly to admit that we have not yet obtained a specific remedy which will effectively destroy tubercle bacilli in the body. We must therefore rely on producing a sufficient immunity in the tissues to resist the attack by virulent tubercle bacilli. This immunity can be obtained:

1. By increasing the natural resistance by means of increased nutrition and sound hygienic conditions.
2. By producing an artificial active immunity in the tissues to the tubercle bacillus itself.

Increased care in infant welfare, better wages to the industrial classes, good nourishing food, a pure milk supply, the prevention of overcrowding, and, above all, good housing conditions and the segregation, of open cases of pulmonary tuberculosis, will obviate to an increasing extent the possibility of direct infection; but all this will take many years to accomplish. In the meantime I feel strongly, from my experience of treating many thousands of cases of tuberculosis in hospital, that we have at our disposal a scientific means by which we can secure some immunity to the bacillus, and certainly of preventing the extension of the disease in the human body when once introduced. Fortunately for civilization, the tubercle bacillus is a parasite and not a saprophyte. It has no existence outside the living body, otherwise the whole community would be endangered.

In the BRITISH MEDICAL JOURNAL of 1903 I published a preliminary note, the gist of which was that human and bovine tuberculosis were separate and distinct infections, producing a different set of symptoms in the human body. The lesions caused by the human bacillus (direct infection)

are pulmonary tuberculosis, tuberculous laryngitis, secondary intestinal ulceration, and, in some cases, lupus. The lesions due to the bovine bacillus, and generally caused by infected milk in the early years of life, are tuberculous glands, mesenteric tuberculosis, surgical tuberculosis of bones and joints (frequently), tuberculous meningitis, and some cases of lupus.

I still hold to this classification and differentiation of the effects of the two forms of bacilli, and, in addition, I firmly believe that the one form confers an immunity in the body to the other. In fact, the two varieties of bacilli will not exist together in the body at the same time.

To some extent this is of great importance in treating the disease, as we are only able to produce immunity in animals by using human bacilli of ordinary virulence, or by attenuating the bovine bacillus to such an extent that it is non-pathogenic.

After treating over 2,000 cases of tuberculosis in hospital with Koch's tuberculins, prepared from virulent cultures, I came to the conclusion that, although a certain amount of success was obtained, the results were not on the whole satisfactory. The uncertain action of the tuberculin and the alarming reactions sometimes produced were very disconcerting, and there is no doubt that in some cases quiescent tubercle was stirred to acute activity.

For this reason I came to the conclusion that it was essential to use cultures of very low virulence, and to avoid, if possible, general febrile reactions. The only certain way of permanently attenuating virulent cultures of tubercle bacilli is by long-continued and systematic subculturing spread over a number of years. In 1906 Professor Koch gave me in Berlin a pure culture on glycerin agar of human bacilli from the sputum of an advanced case of pulmonary tuberculosis. Professor Calmette supplied me with a pure culture of bovine tuberculosis obtained from the mesenteric glands of a cow, and Professor Bang of Copenhagen gave me a pure culture of avian bacilli from the liver of a chicken.

These cultures have been subcultured on glycerin potato and then transferred to glycerin agar, every month for fourteen years in my laboratory, and the present growths represent the 184th generation. The growths are still profuse and true to type, but they are quite non-tuberculigenic and completely non-pathogenic to animals. Every year since 1906 I have injected these bacilli into animals with a view to testing their pathogenicity. Until the year 1912, that is, the 94th generation of subcultures, I noticed no change in their virulence. After that time attenuation became marked, and in a series of animal inoculations of these bacilli in 1913 and 1914 they were observed to be avirulent.

The war interfered seriously with my experiments, but I took the cultures to France and continued the work there for four years, inoculating hares, rabbits, and guinea-pigs in 1916 and 1917. The cultures were in all cases non-pathogenic. In 1919 I inoculated more animals at the Lister Institute, and although large doses were given, no infection whatever was conveyed, and the animals remained alive and well for four months.

These experiments, which have occupied me for fourteen years, conclusively prove that virulent tubercle bacilli can be attenuated to such a degree as to be avirulent and non-pathogenic to highly susceptible animals, and in my opinion we have in our hands a remedy against tuberculosis which will be of the greatest value, not only in the cure of the disease, but what is of still greater importance, in its prevention, by protecting the human body against attack.

Natural attenuation, while removing the virulence and toxicity of the organism, enhances the value of the vaccine in the treatment of disease. In the case of small-pox the immunity derived from an inoculation of the virus from the pustules of vaccinia is considerably greater than that which results from an attack of variola, because the defensive elements in the body have not been weakened in overcoming the virulence of the toxin.

Treatment of disease by vaccines prepared from organisms attenuated naturally means that the production of antibodies will take place rapidly without any preliminary shock to the system such as invariably follows the injection of a vaccine prepared from a virulent strain of bacteria. Hitherto it has not been possible to test this in tuberculosis, owing to the length of time necessary to produce a non-pathogenic strain of the tubercle bacillus.

The results of my work on animals conclusively prove that immunity against infection is produced by the injection of attenuated bacilli, and it is reasonable to suppose that the same thing will hold good in the human. Cattle can be rendered immune to virulent bovine bacilli by previous inoculation with virulent human bacilli; and I am convinced that there is a marked antagonism in the human body between human and bovine infections. It is an indisputable fact that these two organisms cannot flourish in the body at the same time. A child who develops primary abdominal tuberculosis with involvement of the mesenteric glands, or an infection of the neck glands, which are usually caused by the bovine bacillus conveyed in tuberculous milk, is immune to infection by the human bacillus for the remainder of life, and young adults attacked by the human bacillus, producing primary pulmonary tuberculosis, are immune to bovine infections for the rest of life.

The scientific means at our disposal at present for the accurate differentiation of human and bovine infections in the body are not sufficiently accurate to be decisive. There are atypical strains of bacilli which cannot be classed with certainty in either group, and the varying virulence of these bacilli and their effect on susceptible animals is still a matter of some uncertainty in a fair number of cases.

With a view to elucidating this doubtful point as to the real amount of tuberculosis in man caused by these two types of bacilli, and also as to the immunity produced by one infection towards the other—in other words, in order to obtain an answer to the question whether the disease caused by the human bacillus is antagonistic to that caused by the bovine bacillus and vice versa—I instituted clinical observation on a large scale in a Liverpool hospital containing 900 beds, of which I had sole charge for eighteen years. During that time I had the opportunity of treating over 10,400 persons suffering from tuberculosis in all its various forms.

Two hundred beds were devoted to tubercle. Half of these were cases of primary pulmonary tuberculosis; the other half of surgical tuberculosis—glands, bones, joints and lupus. During a period of thirteen years 4,800 cases of phthisis passed through the human wards and 1,820 cases of surgical tuberculosis passed through the bovine wards—a total of 6,620 patients.

The object of the observation was to see what other lesions, if any, were developed in the patients suffering from pulmonary tuberculosis, and how many of the surgical cases developed lesions in the lungs. I was assisted in this work by many excellent house-physicians and nurses, and the results were very striking and important.

In no case of primary pulmonary tuberculosis did we observe during the course of illness tuberculosis of bones, joints, glands, or skin, nor any instance of meningitis. Several cases developed brain symptoms in the last stages of the disease, but they were due to insanity, toxaemia, or exhaustion, and of the cases with meningeal symptoms, those examined *post mortem* were found to be cases of pneumococcal meningitis.

Amongst the surgical cases of tuberculosis 28 developed lung symptoms, and these were all examined by laboratory methods and animal inoculation; 25 died and were carefully investigated *post mortem*. In all cases the infection of the lung was either by direct extension from cervical glands to the apex of the lung, or from a primary focus in the abdomen extending upwards through the diaphragm to the bronchial glands and lungs.

This large clinical experiment convinced me that the human body is attacked by two quite distinct forms of tuberculosis—the one conveyed from person to person by direct infection and attacking chiefly the lungs, or so-called consumption, and the other conveyed by milk from tuberculous cows, and developed in the first few years of life.

These two diseases are caused by different types of tubercle bacilli which will not live in the body at the same time, and, what is of the highest importance, one disease produces immunity to the other.

I have emphasized this point of antagonism between the two infections to show my reason for always using a vaccine prepared from bovine cultures in the treatment of the human infections and vice versa.

The varying degree of virulence of the attacking organism is of supreme importance. The great majority of cases of tuberculosis are fortunately of low virulence, and, given suitable conditions, are favourable for treatment; but in some cases the virulence is so high as to destroy the person in a few weeks or months, and these are the cases popularly known as galloping consumption.

From my own observation I am inclined to think that in this country the virulence of the tubercle bacillus is less than it was thirty years ago. The number of deaths in England and Wales from tuberculosis in 1920 was 12,000 less than in 1919, a most gratifying record of progress in dealing with this terrible disease, which destroys 60,000 lives each year in England alone.

A large percentage of the population receive at some period of their lives a mild infection of tubercle which, in many cases, produces no definite symptoms. These persons recover, and are to some extent immunized against a further and more severe infection.

If we can induce some immunity by artificial means in children whose parents or relatives are tuberculous, and who by constant association with them are very liable to infection, we will have gone a long way towards stamping out tuberculosis. As Roemer says, "The most important problem in the prophylaxis of consumption is the saving of children in phthisical homes from severe tuberculous infection."

The vaccine which I have had prepared from these attenuated cultures is a bacillary emulsion of the bacilli, and contains all the products of the bacillus. It is non-toxic and avirulent, and produces no reaction even in large doses.

For purposes of immunization in susceptible children six injections are given at weekly intervals, and repeated in three months. The doses recommended are 0.001, 0.002, 0.003, 0.004, 0.005, and 0.006 mg. No symptoms whatever have been observed to follow these injections.

In the treatment of the active disease the doses used are much larger than have been possible hitherto; it is recommended that the treatment should consist of at least twelve injections given in increasing doses at intervals of seven days. The doses commence at 0.001 and increase to a maximum dose of 0.025 mg. The vaccine should be freshly prepared from the cultures, and should not be used after one month.

Our chief object in the treatment of active tuberculosis is to limit the spread of the disease in the organs. If we can locate a recent deposit in the apex of a lung, and prevent its extension throughout one or two lobes, the patient will have a good chance of recovery, and I maintain that we can only do this if we can provide his blood with some active immunity with which to resist the infection.

This vaccine, prepared as it is from avirulent cultures, can be used with complete safety in any stage of the disease, and even in advanced cases I have observed great relief from night sweats, toxic symptoms, and erratic temperatures. I have treated 118 cases of tuberculosis with various forms of the products of these attenuated bacilli, but I have decided that the bacillary emulsion is the best preparation.

The results in suitable cases are excellent, but it would require at least two years to gauge accurately the effect of the vaccine for purposes of immunization.

I have succeeded in completely immunizing highly susceptible animals against tuberculosis by the use of attenuated cultures which have required fourteen years' subculturing in the laboratory, and I firmly believe that if all children with a tuberculous history could be safely vaccinated in the manner I have described they would be placed in a better position to resist infection at home.

Prevention is better than cure; and if we are to eradicate consumption, as I firmly believe we will, it can only be by preventing infection of healthy people, and especially children, rather than by devoting all our energies to the cure of those already infected.

The amount of tuberculosis conveyed to infants and young children in milk derived from dairy cows suffering from tubercle is enormous. It is estimated that over one million dairy cows in this country alone are tuberculous, and there seems to be no improvement in this disgraceful state of affairs. The simple process of raising the temperature of the milk to 190° F. makes it perfectly safe, and does not in the slighest degree impair its nutritive value. Sterilized and proprietary milks are quite safe, and free from tubercle, and should be used in preference to unboiled cow's milk.

# THE SURGERY OF THE PERIPHERAL NERVE INJURIES OF WARFARE.*

BY

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## ANALYSIS OF A PERSONAL SERIES OF OPERATIONS.

### *General Survey.*

AN analysis of the total operations performed in my services in the period from March, 1915, to December, 1920, is given in Table I. The figures may be taken as representative of an average individual operative experience, and it is therefore safe to refer briefly to certain general information that the statistics themselves afford.

The frequency with which the ulnar nerve called for treatment, the infrequency of operations on the brachial plexus, and the complete absence of any operation on either the musculo-cutaneous or circumflex nerves in the upper limb, or the anterior crural nerve in the lower limb, are facts to be noted.

In the various types of operation the phases through which the operator passed are illustrated in the large number of operations of the bridge type, and those in which repair was abandoned.

### *Analysis of Results.*

Of the operations in this series it has been possible to investigate the early and later results over periods extending from six months or more in 248 only.

It must be admitted at the outset that this study includes few if any *true* end-results. The most reliable records in our possession are those of the operations performed since 1917, when the advantages of a more efficient segregation of the patients, and the inauguration of the follow-up system were available. But though the conditions were such as in civil surgery might be considered ideal, the greater number of the patients could be kept in hospital for short periods only, and were then distributed in various parts of the country. This difficulty, which has been experienced by all surgeons, explains the comparative paucity of the operation statistics hitherto available.

TABLE I.—*Total Operations.*

| | Suture. | Neurolysis. | Bridge. | Repair Abandoned. | Partial Suture. | Exploration: No Interference. | Exploration: Nerve left *in situ*. | Injection. | Exploration: First Stage. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|
| Brachial plexus ... | 5 | 4 | — | — | — | 2 | — | — | — | 11 |
| Musculo-spiral ... ... | 51 | 15 | 5 | 14 | — | 1 | — | — | — | 87 |
| Median ... ... ... | 70 | 45 | 6 | — | 5 | 2 | 3 | 1 | 1 | 132 |
| Ulnar ... ... ... | 115 | 49 | 12 | — | — | 1 | 5 | — | — | 182 |
| Posterior interosseous | 1 | — | 1 | — | — | — | — | — | — | 2 |
| Sciatic ... ... ... | 51 | 9 | 3 | — | 2 | 1 | — | — | 4 | 70 |
| External popliteal ... | 14 | 2 | — | 6 | — | — | — | — | — | 22 |
| Internal popliteal ... | — | 2 | — | — | — | — | — | — | — | 2 |
| Posterior tibial ... | — | 1 | 1 | — | — | — | — | — | — | 2 |
| Total ... ... ... | 307 | 127 | 28 | 20 | 7 | 7 | 8 | 1 | 5 | 510 |

Operations for severe causalgia, 25—
Median ... ... ... ... 14
Sciatic ... ... ... ... 10
Internal popliteal ... ... ... 1

Operations in which end-to-end suture failed, 53.
Successful suture at second attempt, 1.
Failure of suture at second attempt, 3.

* Part of a Hunterian Lecture on The Results of Operations for the Repair of Nerve Injuries, delivered before the Royal College of Surgeons of England.

In this post-operative study the presence or absence of signs of recovery have been recorded after personal examinations only. Whilst many patients living at a distance have from time to time replied to inquiries as to their progress, suggestions in their reply indicating recovery or otherwise have always been ignored. It is perhaps unnecessary to lay stress on the fallacies of conclusions drawn from such impersonal investigations; my excuse is that one has occasionally seen in the possession of out-patients forms which were to be filled up recording the impressions of the man himself on the alterations in the sensory and general functional condition of his limb.

The 248 operations from which information as to results have been available include 150 cases of end-to-end suture, 80 of neurolysis, and 18 of bridge operations.

### Results of End-to-end Suture: 150 Operations.

In a preliminary report based on a study of 271 suture operations, issued a year ago by my colleague Stopford,[1] the bulk of my own operations up to date were included. The experience of a further period of twelve months has made it possible to collect additional evidence concerning the fate of a considerable number of the patients with whom we have been in touch.

Table II.—*End-to-end Sutures: Total, 150.*

| | Total. | Proximal Muscles only. | Proximal and Distal (incomplete). | Proximal and Distal (total). | Distal alone. | Associated Sensory Recovery. | Sensory Recovery alone. | Number of Recoveries. | Failures. |
|---|---|---|---|---|---|---|---|---|---|
| Musculo-spiral ... ... | 35 | 10 | 11 | 5 | — | all | — | 26 | 9 |
| Median: | | | | | | | | | |
| Upper arm ... ... | 10 | 7 | 3 | — | — | in 5 | — | 10 | nil |
| Forearm ... ... | 20 | 3 | — | — | 6 | in 6 | 8 | 17 | 3 |
| Ulnar: | | | | | | | | | |
| Upper arm ... ... | 27 | 19 | 3 | — | 1 | in 14 | 1 | 24 | 3 |
| Forearm ... ... | 20 | — | — | — | 10 | in 14 | 7 | 17 | 3 |
| Sciatic: Trunk ... | 21 | 16 | nil | nil | — | in all | — | 16 | 5 |
| Segmental ... | 4 | 2 | nil | nil | — | in all | — | 2 | 2 |
| External popliteal ... | 9 | 4 | nil | — | — | in all | — | 4 | 5 |
| Posterior interosseous | 1 | — | — | — | — | — | — | nil | 1 |
| Plexus ... ... ... | 3 | 2 | — | — | — | 2 | — | 2 | 1 |

Recovery, 118 = 79 per cent.; failure, 32.

The frequency and type of recovery after nerve suture are illustrated by the statistics in the tables. The facts as to the recovery of motor function are arranged under the headings of the proximal and distal muscle groups, a classification which is found to be convenient, particularly for the upper limb. In the whole series there are no examples of absolutely complete and perfect recovery, excepting possibly in 5 of the cases of musculo-spiral and 2 of those of external popliteal suture.

The operations in which the existence of recovery is charted include every variety and type of incomplete restoration of conduction in the sutured nerve. It is not considered a logical procedure to classify such recoveries into further arbitrary special divisions, such as "slight," "marked," and so on, for the simple reason that the periods of post-operative observation are not constant for any one group of allied operations. Given long periods of time, many of the imperfect recoveries of to-day will progress, or have already progressed, towards the stage of complete recovery. The standard of failure adopted in my analysis is the complete and stationary absence of recovery after a year or more, in some cases confirmed by evidence obtained on re-exploration.

With regard to sensory recovery, in very few cases has there been more than a slight recession of analgesia or an incomplete restoration of protopathic sensibility.

The information and conclusions as to the late results of suture may best be embodied in a consideration of the main factors which have determined, delayed, or entirely prevented success.

1. *The Period of Delay between the Original Injury and the Performance of the Operation.*

In my own series the influence of the time factor has been definitely proved. As a general rule sutures performed within a period of eighteen months show little appreciable differences in the time of the onset of recovery, or the rate and ultimate completeness of the recovery. After a delay of two years recovery is often tardy or incomplete; in some cases it fails completely. This truth has long been established as a fundamental factor in prognosis in the older nerve surgery (Kennedy).[2]

My records confirm what has been pointed out in Stracker's careful analysis of the operations performed in the clinic of Hans Spitzy of Vienna—that the degree of delay within the safe period does not influence the percentage of cases showing recovery, and does seem to prejudice the ultimate quality and type of the regeneration. In complete failure the time factor, quite apart from other influences, plays an important part. It is assumed that this is dependent on the development of permanent retrogressive changes in the spinal cells, and to a much less degree to peripheral degenerative changes in the muscles. On the other hand, it would appear from the analysis of the operation results in the service of Sir Harold Stiles of Edinburgh that this factor exerted a negligible influence (Forrester Brown).

2. *The Recrudescence of Septic Infection in the Limb.*

Recrudescence of infection at a period after the suture was seen in a number of cases in my series; where this arose spontaneously it does not appear always to have affected the regenerative process, but it has been my fate to see a definite recession in the regeneration which had already begun, after the exploration of an associated ununited fracture, followed by infection. This unfortunate sequela is one which could have been avoided, and perhaps is hardly to be cited as a fair test of the resistance or lack of resistance to sepsis of the regenerating nerve. In the recovery stage of a number of cases of suture of the sciatic nerve the trophic ulceration seen under the base of the fifth metatarsal, or in the terminal phalanx of the great toe, where definite necrosis has resulted, provides a continued source of infection, which might conceivably be absorbed and travel upwards towards the area of suture. Delay or cessation in recovery has been invariably associated with this complication, and I would suggest that it is in some way connected with the absorption by the regenerating nerve of distal sepsis.

3. *Anatomical Situation of the Suture.*

The distance of the line of suture from the spinal centres, or conversely from the distal extremity of the limb, is seen to be an important factor in determining the fate of the regenerative process. This is illustrated by a study of the time of onset of the appearance of recovery in the muscles supplied at successive levels, and in a comparison between the results of suture in the proximal and distal parts of the limb respectively. The times of the appearance of recovery in the chief muscle groups have been carefully charted in Stopford's recent contribution, and are seen also in the monograph of Stracker already referred to.

Recovery in the proximal muscles begins at an earlier or later date according to the proximity of the suture to the spinal cord, and occurs in regular descending fashion in accordance with the anatomical origin and distribution of the motor branches. Thus, for example, after suture of the musculo-spiral nerve in the upper, middle, and lower third of the arm, return of power is manifest in the supinator longus at about the seventh, sixth, and fourth months respectively. Distal recovery also shows these differences in time relation. In Stracker's figures no recovery was seen before one year after suture in the distal muscles of the musculo-spiral, median or ulnar supply, and this irrespective of the level of the suture. On the whole this is borne out by the records of my own operations. Thus the time taken in neurotization of the distal muscles is not entirely dependent on the distance which down-growing axons have to travel. It has been concluded from this that the results of suture are better in the proximal part of the limb than in the distal. Stracker states that, in general, sutures below the origin of the proximal muscle branches give bad results. This would appear to be correct as a broad statemont, but on careful

examination requires certain qualifications. If the results of suture of the median and ulnar nerves in the upper arm and forearm are compared as regards distal recovery alone, both motor and sensory function combined, which means that a period of twelve months at least must have elapsed, the quantitative recovery appears to be roughly equal in each group.

4. *Influence of Topography.*

The inaccuracies of regeneration due to the shunting of motor fibres along sensory channels and vice versa are undoubtedly one of the causes of imperfection in the recoveries, and may be of such a degree as to determine complete failure. It has been impossible in a close perusal of one's operation records to correlate in each case the potential influence of this factor with the type of recovery seen. In the sciatic nerve sutures it has been easy to retain an accurate topography, whilst in the musculo-spiral the comparatively scanty sensory bundles, even when misdirected, have not prevented the transmission of a large proportion of motor fibrils along appropriate channels. The exact rôle of topographical errors, as applied to the individual operations, cannot be settled until it is possible to examine a large number of successful sutures of the median and ulnar nerves after a period of three years or more. In certain situations—for example, in the lower half of the forearm—where suture of either the ulnar or median nerves has been achieved with what might be claimed as faultless topography, little direct proof of its beneficial effect is obtained.

Topographical failure is best illustrated by the suture of a nerve of smaller calibre to a larger trunk, as in the case of suture of the posterior interosseous to the musculo-spiral, and of the anterior tibial and musculo-cutaneous to the external popliteal—operations which account for 8 cases traceable in my series, and in all of which complete failure resulted. The topographical factor in regeneration is, however, usually cited as an illustration of the apparent superiority of the results of suture of the musculo-spiral nerve over those of the median and ulnar nerves, and of the delay or absence of recovery in the distal muscles.

5. *The Influence of Perineural Surroundings—The Nerve Bed.*

It does not appear from my own observations that the perineural surroundings have influenced the occurrence of recovery after nerve suture in any way, except in a few cases where the nerve trunk has been subjected to the friction of a bony groove, as in the case of the ulnar at the elbow, or has been left in close relation to bare tendons—for example, median suture at the wrist. The deleterious effects of a nerve bed of this type have contributed to the complete failure of one case of ulnar and one of median suture, but such failures are to be regarded as preventable.

6. *The Influence of Complications.*

(*a*) *Vascular.*—In a number of upper arm sutures of the median or ulnar nerves or both, where ligature of the brachial artery has been performed in the early days of the injury, there has been little appreciable effect on the rate and degree of recovery. Where contractures and other signs of ischaemia have coexisted and the total mechanical disability is naturally great, the clinical evidences of the recovery of the nerve have often been masked.

(*b*) *Non-union of Fractures.*—The continued existence of non-union of a fracture without active inflammatory signs in the neighbourhood of the recovering nerve has retarded or prevented recovery in two musculo-spiral sutures in my series; one showed a failure of distal regeneration after four years, and the other a total absence of any sign of recovery. These failures are to be attributed to the effect of tension and friction.

7. *The Continuance of Active Interstitial Neuritis in the Proximal Nerve.*

This is a potent cause of delay or failure, which theoretically is avoidable by a free resection preparatory to suture. But it is certain that histological evidence of interstitial change may often be present in the proximal part of the nerve trunk when there is little or no macroscopical sign of its existence. Where there has been a long delay owing to the presence of inveterate sepsis in the limb, the interstitial neuritis finds its maximum development. In my own operations complete failure or imperfections in recovery have been dependent on this factor, and particularly in the sciatic nerve, where the ill effects are manifested during the stage of tardy recovery by the development of the signs of irritation. In three cases, after a period of more than two years, the pain in the internal popliteal distribution is a most serious handicap to the patient and continues to defy every form of treatment. On the other hand, in one of the complete recoveries after musculo-spiral suture definite evidence of interstitial neuritis was seen in the proximal part of the nerve trunk at the time of operation, and, owing to the size of the gap, the suture was performed at a level which was considered far from ideal.

*Qualitative Results of Nerve Suture.*

It remains now to judge the results of these nerve sutures from a qualitative standpoint. In this estimation it is necessary first of all to eliminate from the total disability of the limb the contribution of the coexisting injuries of other tissues. But function dependent on a restoration of nerve conductivity alone is itself essentially complex. Success depends not merely on the simple restoration of adequate motor and sensory conduction, but on the development of co-ordination in the particular movements in which the efferent and afferent supply of the sutured nerves are concerned.

In the musculo-spiral sutures where full conductivity has been restored, and where recovered muscle groups have achieved considerable power, there has been as yet no perfect individual extension of the fingers, no synergic function in the extensor muscles of the wrist, and there is on the whole an imperfect control over the extensor muscles of the thumb.

In the median nerve poor function has been the rule, chiefly owing to the very limited sensory recovery. The helpless anaesthetic index finger, which is characteristic of most of these cases long after the operation, is a striking illustration of the importance in function of a restoration of the median sensory mechanism.

In the ulnar nerve, where there is often a mobile hand without contractures, the gross function is little diminished even in the presence of a complete syndrome of interruption, and full restoration is of little moment except for the skilled worker. To many of these hands the addition of conductivity in the ulnar nerve has made little or no difference in function.

The full sciatic syndrome in itself does not cause gross loss of function in the lower limb as regards the act of walking. It is difficult to estimate the increased value of the motor recovery, which at the best has been moderate power in the calf and a less complete and powerful action in certain muscles of the extensor group.

RESULTS OF THE OPERATION OF NEUROLYSIS.

Whilst it is possible to study the results of end-to-end sutures in a truly mathematical fashion, a scrutiny of the results of the operation of neurolysis is beset with many difficulties. It will be sufficient to reiterate and amplify from a consideration of the results in 80 cases what is regarded in my opinion as the legitimate scope of this operation.

In the results are seen both recoveries, partial and complete, and complete failures. There have been no rapid recoveries within the period of nerve regeneration, for the type of lesion in which this might have occurred has not been explored. Where recovery has been seen it has been on the conventional lines of the ordinary regeneration as regards time and general progress. A certain number of operations have been premature explorations for lesions of a low grade, in which spontaneous regeneration was at the time proceeding. Where failure of recovery has occurred the intraneural changes have been of such a nature and extent as to inhibit the down growth of regenerating axons, and the extraneural operation has failed to alter the intraneural conditions. Whilst improvement has occurred in the neurological syndrome after the operation of neurolysis in 75 per cent. of cases, it has been impossible to prove that the operation itself alone has determined this.

For these reasons I would urge that the limitations of the operation of neurolysis as a definitive factor in the surgical treatment of the warfare lesions of nerves are to be fully realized.

### RESULTS OF OPERATIONS FOR CAUSALGIA.

My series includes 25 operations performed for severe causalgic manifestations, 14 on the median nerve, 10 on the sciatic nerve, and 1 on the internal popliteal nerve.

1. The median operations consisted of (*a*) resection and suture on eleven occasions (twice on the same nerve); (*b*) neurolysis on two occasions, and (*c*) one intraneural injection of quinine and urea. Of the resection and suture operations complete relief of pain followed immediately in nine; the pain was lessened but persisted indefinitely in the two resections performed in the same nerve in one patient. In this case there existed a grave contracture and a useless concealed hand when the man was first seen; ultimately the limb came to amputation. The cause of failure was the persistence of intraneural fibrosis in the nerve trunk, and its upward spread for many inches proximal to the line of suture.

Both neurolysis operations failed to produce relief and early re-exploration was necessary; in each, resection and suture was carried out with complete success.

The one intraneural injection for a mild case of causalgia produced a moderate degree of relief, and the pain showed signs of diminution with ultimate disappearance in a few months.

2. The results of resection and suture of the sciatic nerve were as satisfactory as in the case of the median, judging by the immediate relief afforded, but during the recovery stage, in three cases, the return of severe irritation has been a disappointing experience. The cause of this is also to be attributed to the progressive intraneural fibrosis.

3. The one neurolysis operation performed on the internal popliteal nerve, for what appeared to be a true severe causalgia, was followed by immediate cessation of the pain. In this particular case a strong functional element was present, and it is not certain that true causalgia existed, although the symptoms were mimicked very closely.

In the exploration of a nerve which exhibits a condition of profound irritation, the hyper-excitability of the nerve trunk and the muscles supplied by it, both above and below the lesion, is a striking phenomenon.

The efficacy of the operation of early resection and suture for severe causalgia is beyond criticism. It would appear to be a more exact procedure than the equally or even more destructive method of alcohol injection. It has not been my experience to meet the type of case in which still more drastic procedures have been inevitable, such as section of the posterior roots.

The operation of Leriche,[3] stripping of the periarterial sheath, is founded on an erroneous conception of the anatomical situation of the vasomotor fibres of the limb, and is to be mentioned merely for the sake of completeness.

### GENERAL CONCLUSIONS ON THE LATE RESULTS OF NERVE OPERATIONS.

References have been made from time to time to the results quoted in other contributions to the literature of the peripheral nerve surgery of the war. From this literature, already vast, it has been impossible to collect and compare on any recognized standards the total statistics as to the late or end results of the various forms of operations. From a wide study of this literature, and an intensive study of my own material, it is possible merely to enunciate broad generalizations influenced in particular by the consideration of the causes of failure and success.

During the past year it has become increasingly difficult in this country, at any rate, to keep in touch with the patients who have been operated upon, even during the last two years. The chances of acquiring further comprehensive knowledge regarding true end-results would therefore seem to be slender. This is a bitter disappointment after the labours of a number of years. But, for some little time, a small stream of patients with nerve injuries still unoperated on, or showing failure after previous operation, will continue to flow into the surgical centres of the Pensions Ministry. Such patients, on the whole, are now undesirous of submitting to operative procedures. But the surgical lessons gained from the amount of experience behind us are yet to be applied for the benefit of a few. And it is of great economic importance that clear indications as to the advisability at this date of the exploration or re-exploration of the injured nerves should be laid down.

Every lesion will date back at least two years, so that the optimum period for the surgical repair of the nerve is now past. But for perhaps a year longer it will be worth while advising operation in selected cases. Before doing so, the economic value of the restoration of nerve conduction to the future capacity of the limb must be gauged. In many limbs an operation is now a waste of time. From a serious consideration of the problem as it presents itself at the time, it is suggested that the exploration or re-exploration should be considered under the following conditions:

1. In complete lesions of the median or ulnar nerves in the upper arm restoration of function in the proximal muscles is to be expected, even after long periods of delay, but distal recovery may probably not take place. For lesions of these nerves, in which conduction is already present as far as the proximal branches, with the total failure of distal regeneration, exploration is on the whole advisable; but short of resection and suture, which may be unjustifiable, nothing can be done.

2. In complete lesions of the median and ulnar nerves in the forearm the potential restoration of sensation in the median is of such great importance as to warrant making every effort to ensure its occurrence. In lesions of the median in which partial sensory conduction is present, but with complete motor loss, resection and suture at this date should be strongly condemned. For the ulnar, where the intrinsic muscles are alone inactive, resection is always worth while.

3. In all complete sciatic lesions where end-to-end suture can be reasonably expected.

4. In musculo-spiral lesions exploration of the nerve should precede the performance of tendon transplantation.

### ALTERNATIVE OPERATIONS.

Although a technical consideration of those alternative operations for the restoration of function where nerve repair has been deliberately abandoned, or has failed to ensure conduction or function, is outside the scope of the present study the question of the appropriate time and indications for their exhibition is one which is intimately concerned with the observations on the failures and successes of the suture operations.

Where the nerve lesion is declared to be irreparable after an exploratory operation, the indication for the performance of an alternative operation is clear. But in the case of imperfect function following the incomplete restoration of conduction the rôle of the alternative operation cannot be so readily defined. Many of the operations performed under the latter heading have been premature, and have been done early in the reconstructive surgery of the war when the normal prolonged stage of recovery of the injured or repaired nerve was not fully realized. The capacity for regeneration and ultimate function of the nerve after repair is apt to be minimized. Every surgeon who has lived close to this problem must have felt at times despondent. The immediate failures, or late failures, are easily explained, and many of the causes can be avoided. It is likely from what we have seen of the behaviour of the regenerating nerve that after long periods of time in a considerable number of instances there will be well marked recovery of function. It is to be admitted, on the other hand, that to wait for a future recovery of uncertain value is likely to be unsound. Again, the alternative operation itself may in no way jeopardize the recovery of the nerve, and therefore little harm can be done by its early performance. Few of the alternative operations have entered permanently into one's surgical repertoire. In the upper limb these are above all the now classical operation of tendon transplantation for irreparable musculo-spiral injuries, the results of which are extremely gratifying; the simple tendon transplantations for restoration of flexion of the fingers or thumb in median and ulnar injuries; and, in the lower limb, the destructive operation of tenodesis of the ankle as an alternative to the lifelong wearing of apparatus.

Recently a new procedure has been added to the alternative operations which belongs to peripheral nerve surgery itself. This is the implantation of the proximal end of the radial nerve into the median nerve at the wrist—an attempt to restore that lost sensory function in the median area which produces such a grave incapacity. This operation was introduced by Harris[4] of Toronto, and is

supported by the report of one successful case. For the few irreparable lesions of the median nerve in the forearm this operation may be worth a trial.

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## HERPES AND VARICELLA.

BY

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THE following account of an outbreak of varicella in a ward, apparently originating in a case of herpes zoster, seems of sufficient interest to record.

W. G., female, aged 8 years, was admitted to a diphtheria ward on November 16th, 1920, suffering from a severe attack of that disease. Unfortunately she developed scarlet fever from another case admitted with diphtheria, who was also incubating scarlet fever. W. G. was transferred to a small ward, X, on the same day. Here were three other children, M. T., A. F., and L. Y. For administrative reasons these four children were moved on January 27th to a large ward, F., containing twenty-five beds and cots.

On February 4th, a week after transfer, W. G. developed what appeared to be a typical herpes zoster over the area supplied by the twelfth dorsal and first lumbar nerves on the left side. The distribution extended completely round the left side of the trunk, within the area indicated—that is to say, from the mid-line in front to the mid-line behind. The lesions were closely set and went through the usual changes of herpes zoster. As the question of the relationship of herpes and varicella was in our minds for investigation when opportunity should arise, a careful examination was made for scattered lesions elsewhere on the body, and none were found. The point that we should like to mention particularly is the fact that the child had absolutely no pain, either before or during the persistence of the lesions. Herpes zoster, of course, is commonly a painful affection. W. G. had no previous history of varicella and presented no scars of a former attack.

On February 17th—that is, thirteen days after—three children in the ward developed varicella; on the following day, the 18th, four more showed the typical lesions, and by February 27th another child had incubated the disease. The position of the children in the ward, their respective ages in years, and date of onset of varicella, were as follows:

| *South Side of Ward.* | | *North Side of Ward.* | |
|---|---|---|---|
| No. of Bed. | | No. of Bed. | |
| 1. | Died. S.F. and Diph. | 14. | X. Aged 5. |
| 2. | V.P. Aged 6. | 15. | X. Aged 3½. |
| 3. | V.P. Aged 5½. | 16. | *M. T.* V. Aged 4. |
| 4. | X. Aged 6. | 17. | X. Aged 5. |
| 5. | *W. G.* Aged 8. Herpes zoster. February 4th. | 18. | X. Aged 4. |
| 6. | *L. Y.* X. Aged 7. | 19. | *A. F.* V.P. Aged 6. |
| 7. | V.P. Aged 9. | 20. | V. Aged 2½. February 17th. |
| 8. | V. Aged 7. February 27th. | 21. | V. Aged 4. February 17th. |
| 9. | V.P. Aged 7. | 22. | V. Aged 2. February 18th. |
| 10. | X. Aged 12. | 23. | V. Aged 5. February 18th. |
| 11. | X. Aged 6. | 24. | V.P. Aged 7. |
| 12. | V. Aged 5. February 18th. | 25. | X. Aged 8. |
| 13. | V. Aged 6. February 17th. | | |

V.P. = Varicella previously. X. = Exposed to infection.
V. = Exposed to infection and developed typical varicella.
*L. Y.*, *M. T.*, *A. F.* = three patients from Ward X.

No case of varicella had occurred in the hospital for some weeks previously, and certainly the case of herpes has not been exposed, as far as is known, to any risk of varicella infection. When W. G. developed herpes she had been in hospital about eleven weeks. There had not been a previous case of herpes zoster in the hospital for some months, and then it occurred in a ward far removed from W. G.'s, and, it should be noted, was not followed by varicella. W. G.'s herpes arose *de novo*. Did she originate the outbreak of varicella, or was there a missed case presenting only one or two lesions, the time relation ship being merely a coincidence?

Morphologically, W. G.'s lesions were typical of herpes zoster. She had no previous history of varicella, nor scars of a former attack, neither has she since developed varicella as a result of contact. The complete absence of pain or even of appreciable malaise are noteworthy. The incubation period of thirteen days is on the short side as compared with previous ward outbreaks of varicella in this hospital in the earlier part of last year. Previous outbreaks have had an incubation period of from seventeen to twenty-one days. The incubation period of varicella is of course very variable, and the present outbreak may be due to another strain of the virus. Varicella in this country is practically never fatal. The experience of one of us (E.H.R.H.) at a military infectious diseases hospital in Mesopotamia was that varicella in Indian troops and followers was very common and frequently severe, death from pulmonary complications being by no means unknown. Careful pathological investigation of such cases might lead to important information upon the etiology of the disease.

## CHRONIC SUPPURATIVE OTITIS MEDIA:

### *FOLLOWED BY LEFT TEMPORO-SPHENOIDAL ABSCESS AND MENINGITIS.*

BY

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THE following case deserves recording by reason of (1) the presence of pus cells and bacteria in the cerebro-spinal fluid, and (2) the reaccumulation of pus in the brain after having been once successfully evacuated, with extensive paralysis and ultimate perfect recovery.

L. P., female, aged 23 years, was admitted to hospital on October 27th, 1920, in a drowsy condition, with a temperature of 101.6°, pulse 82, respirations 20.

*History.*

The history was only obtainable from the patient, as she had no relatives or friends. When roused she stated that she had had ear trouble (doubtful on which side) since Christmas, 1919, the cause unknown. She had severe pain in the left side of the forehead and left temporal region in Whit week 1920, and visited a hospital in the district, obtaining some relief. The headache had been worse for the last three weeks.

*Condition on Admission.*

She was drowsy, but could be roused to answer questions. She was slightly aphasic, complained of headache on the left side of the head. She had vomited twice since admission.

*Nervous System.*—(*a*) Motor: There was slight weakness in the grip of the right hand, no other paresis or paralysis. The sphincters were normal. There was some rigidity of the neck muscles. (*b*) Sensory: There was nothing abnormal as far as one could ascertain in her drowsy state. (*c*) Reflexes: There was slight increase of the right knee-jerk. The right superficial abdominal reflex was brisk. No ankle clonus or Babinski reflex was present. (*d*) Eyes: The pupils were dilated, equal, reacting to light. The discs were not examined. There was no nystagmus, no photophobia. There was marked loss of the *naming* centre.

*Ears.*—The right membrane had a small central perforation with a viscid purulent discharge. The left had marked meatal stenosis, a large vascular polypus obstructing the already narrow meatus. There was no visible otorrhoea. There was no tenderness or oedema over the mastoid processes, no pain on percussion of the cranium. The tissues of the neck were normal.

*Lumbar Puncture.*—There was positive pressure and a cloudy cerebro-spinal fluid. (See pathologist's report below.)

*Operation* (October 27th, 1920).

A radical mastoid operation was performed on the left side. The mastoid antrum was full of pus under great pressure, and very foul. The dura mater of the middle fossa, exposed by disease, was covered with granulations bulging and pulsating, and the middle ear was full of granulations. The lateral sinus and dura mater of the posterior fossa, exposed by chisel, were found to be healthy. The remains of the tegmen tympani with a portion of the squamous portion of the temporal bone were removed, and the left temporal lobe was explored. A large abscess containing very foul pus was evacuated and drained by two rubber tubes side by side (diameter ¼ inch). The auricle was stitched forward and a buttress built around the margin of the wound with gauze so as to avoid pressure on the tubes.

*Pathologist's Report* (Dr. Renshaw).

Cerebro-spinal fluid: Pus cells were present. A large number of Gram-negative diplococci were in the film (*? Diplococcus mucosus*), present in culture, also in agar, in large numbers.

Pus from brain abscess: Staphylococci and streptococci were present in pus in large numbers, and some long thin curved Gram-negative bacilli (?anaerobes). Necrotic débris was present, but very few pus cells. Later, *Diplococcus mucosus* was found in a culture of the brain pus.

*After-History and Treatment.*

Urotropin gr. x four-hourly was given for the first forty-eight hours, and then three times a day. The outer dressing was changed daily after twenty-four hours and the mastoid cavity irrigated, the brain cavity draining fairly well.

November 2nd, 1920. Mentally the patient was greatly improved, temperature 99.6°, pulse 110, respirations 22. The wound was very foul. Tubes were removed, followed by a copious discharge of pus. The abscess cavity was gently irrigated, and the tubes replaced.

November 6th, 1920. Mentally the patient was good, taking her food well. Temperature and pulse were normal. The wound was cleaner, and the tubes being naturally expelled, were shortened.

November 11th, 1920. The patient's temperature was 101°, pulse 100, respirations 18. The wound was looking very clean. The patient appeared very well and had no complaint. The tubes had been expelled two days ago. There was an oedematous-looking bulging of the brain, into which sinus forceps were gently inserted, but only a few drops of a clear fluid were evacuated. In the evening the patient suddenly became unconscious and completely paralysed on the right side, with severe headache (hand to left side of head), temperature 101°, pulse 116, respirations 18, pupils dilated, the right side of the face immobile, and the face cyanotic. The sinus forceps were inserted into the brain cavity, and at first clotted blood was evacuated, but at a depth of 2½ in. (upwards, forwards, and slightly inwards from the tegmen antri) a copious discharge of pus and gas was evacuated. A tube would not remain *in situ*, so the oedematous hernia cerebri was excised flush with the tegmen, and the cavity was lightly packed with gauze.

The patient made a slow uninterrupted recovery. The temperature gradually subsided after reaching 103.8° on November 13th, and was normal by November 21st, remaining so. An extensive hernia cerebri, dressed with green protective, drained well and gradually subsided without any lumbar puncture being performed. The paralysis gradually improved. On February 11th, 1921, the patient walked normally, there was no sign of any paresis, the wound was healed, the ear dry, and she was mentally well. On being seen on March 6th, 1921, the patient was very well and mentally sound.

In conclusion, I wish to draw attention to the following: (1) No tenderness, pain, or oedema over the mastoid, by no means uncommon. (2) Exposed dura mater was pulsating well (a pre-operative lumbar puncture performed). (3) Lumbar puncture was never employed therapeutically throughout the course of the disease.

As an explanation of the sudden onset of coma on November 11th, 1920, I would suggest that the septic focus still present in the brain had ulcerated through a blood vessel, producing a sudden haemorrhage with compression and hemiplegia (clot was first evacuated from the second brain abscess cavity). Naturally my first impression was that the abscess had ruptured into the lateral cerebral ventricle, a supposition which is, I think, untenable having regard to the subsequent progress of the case.

# Memoranda:

## MEDICAL, SURGICAL, OBSTETRICAL.

### ENCEPHALITIS LETHARGICA TREATED WITH INFLUENZA BACILLUS ANTIGEN.

IN the BRITISH MEDICAL JOURNAL of March 27th, 1920, one of us (W. M. C.) related the histories of four cases of lethargy treated successfully with pure influenza antigen (vaccine). The paper has apparently received little attention, since recent literature reveals no ideas as to the nature of the infection, much less does it reveal any successful line of treatment. We think it, therefore, desirable to relate the following case, the treatment of which with pure influenza antigen was just as dramatically successful as that of No. III of the other cases previously recorded.

The patient, a girl aged 5 years, living in the South of Ireland, was taken ill on February 18th, 1921, with shivering, drowsiness and headache most intense behind her eyes. She was seen (by D. C.) on February 21st, when her temperature was 102.6° F., the pulse 120. She was asleep, and could only be roused with difficulty; when the eyes were open the conjunctivae were seen to be injected—the typical pink eye of influenza. She was very constipated, necessitating enemas, but she had not incontinence of urine. There was a watery discharge from the nose. She had muscle twitchings—very marked in the eyelids. When roused she answered questions slowly but intelligently, but was profoundly asleep again within a few minutes. Her temperature fell to 99° F. and her pulse to 95 by February 24th, but the lethargy seemed to increase, the patient only being awake when roused to take food. W. M. C. was then consulted, and 1½ million *B. influenzae* antigen were given on the morning of March 2nd under the skin of the hip; her temperature was then 99° and the pulse 95. She was asleep again a short time after the injection. At the end of six hours she woke up quite bright and cheerful; the temperature had fallen to 97.4° and the pulse to 76. She remained awake four hours. On March 4th she remained awake from 9 a.m. to 6 p.m. The drowsiness then gradually increased again until, on March 10th, she was given 2½ million. She slept for three hours and woke up bright and gay. Next day, however (March 11th), a reaction appeared. She slept a good deal. She complained of headache. The temperature rose to 99.4° F., the pulse to 115. The discharge from the nose came on again, and the conjunctivae were injected. These symptoms had passed away by the next day, and she has remained normal in every way ever since. She has been given a few more increasing doses of antigen.

The rapid relief after the first dose, just as significant diagnostically as the focal and general reaction after the second dose, makes it certain to our minds that the influenza bacillus was the causative microbe. Unfortunately, owing to the distance from a laboratory, no satisfactory bacteriological examination of the nasal discharge could be made, and it was not attempted.

The antigen used was made from a recent growth on human blood agar and was not killed by heat, so that nothing was done which would in any way reduce its toxicity, and therefore its potency as an antigen.

W. M. CROFTON, M.D.
Dublin. D. COSTELLO, M.B.

### ARTIFICIAL RESPIRATION IN THE NEWBORN.

THE method of artificial respiration here described has, in my experience, proved more certain and effective than any method now in vogue. It is, as will readily be understood, only applicable in the case of infants. I was led to elaborate it by noticing that a child who had inspired liquor amnii, and was held head downwards in order to free the respiratory passages, emitted a sigh when the abdominal contents pressed on the diaphragm. This led me to reverse the position of the infant to allow the lungs to expand.

The infant is held in the following way: The back of the neck lies on the palmar surface of the left hand, the occiput being supported in the hollow between the thumb and forefinger which grasp the mastoids. The right hand holds firmly both ankles of the infant from behind, so that the ulnar side is on the calves, the radial side at the heels. The infant is held with its long axis nearly vertical, at an angle of about 15 degrees, head upwards, and is then allowed to move quickly downwards by its own weight some two feet. The abdominal viscera fall towards the pelvis, the diaphragm is depressed and inspiration initiated. The infant is now lifted, feet first, to the right of the operator, so that it is now head downwards at an angle of 15 degrees to the vertical. It is again moved smartly downwards, head first, about two feet. The abdominal viscera, falling against the diaphragm, expel air from the lungs equivalent to expiration. This movement, at least to some extent, must also act as massage of the heart and so be a direct stimulant. The whole cycle is repeated about fifteen times to the minute, and the first movement will often elicit a sigh if not a more pronounced response. Needless to say all semblance of violence must be avoided.

Harrogate. W. OSBORNE GREENWOOD, M.D., B.S.

### OLIVE OIL SOFT SOAP AS A SHAMPOO IN PITYRIASIS CAPITIS.

THE exceedingly common affection called pityriasis capitis or dandriff is often unsuccessfully treated by the general practitioner owing to neglect of the great essential of systematic shampooing at regular intervals, and with the much advertised use of "shampoo powders" this disease is aggravated, especially in childhood, whereas if the scalp disease was cured in early life there would be no kindred eruptions of the face and trunk in adult life. The great advantage of olive oil soft soap as a shampoo is, first, that it acts as an antiseptic, thereby rendering the organism, which is confined to the superficial layers of the epidermis, and which is responsible for the disease, inactive; secondly, the solvent and stimulating action is less irritating than that of ordinary soft soap. The scalp should be shampooed regularly once a week in bad cases.

The soap is dissolved in hot water till a thick lather is obtained, with which the scalp is thoroughly rubbed. After shampooing rinse with plain warm water.

London, S.W.11. K. WORSLEY POOLE, M.D.

## CONGENITAL DEFICIENCY OF THE DIAPHRAGM.

THE following case seems worthy of record inasmuch as congenital muscular deficiency accounts only for some 10 per cent. of diaphragmatic herniae, and in this case the strangulation was not in the original sac, but in a diverticulum from it.

A child, aged 8 months, had been perfectly healthy until three days before admission to the Preston Royal Infirmary, when it commenced to vomit and the abdomen became gradually distended. There had been absolute constipation.

On examination after admission, the pulse was rapid and feeble, the lips were cyanosed, and the abdomen was very considerably distended, hard and drumlike, but nothing was palpable. *Per rectum*, the abdominal contents were bulging with the anterior rectal wall, otherwise there was nothing of note.

Laparotomy was immediately performed and the small bowel and ascending colon were found to be distended, while the descending colon was collapsed. The stomach was lying well up in the left side of the thorax, where there was apparent absence of the left dome of the diaphragm. The transverse colon had passed up beyond the stomach into a further sac and had become obstructed. The large bowel was reduced by the division of the constricting band, and the abdominal cavity was rapidly closed. Unfortunately, the patient, who was in a condition of profound toxaemia, survived the operation by a few minutes only.

On *post-mortem* examination there was found congenital deficiency of the left dome of the diaphragm; the left crus was present, and from it a few fibres passed round the left side of the oesophagus to join the anterior parietes slightly to the left of the middle line. Through the deficiency the peritoneum bulged into the thorax, where it was in direct contact with the basal pleura, the cardiac portion of the stomach reaching as high as the third costal interspace. At the apex of this sac the pleuro-peritoneal lining had given way to form a further sac in which the transverse colon had become strangulated. The heart was found lying completely to the right of the middle line. The left lung was collapsed and had apparently never functioned; it sank on being placed in water.

When the mother was questioned she recalled that there had been at times a bulging of the lower part of the left side of the thorax after feeds. I am indebted to Dr. Healey, honorary visiting surgeon, for permission to publish these notes.

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# Reports of Societies.

## PRURITUS ANI.

AT a meeting of the Subsection of Proctology of the Royal Society of Medicine on April 13th, with the President, Mr. W. E. MILES, in the chair, a discussion took place on pruritus ani, its causation and treatment.

Mr. J. P. LOCKHART-MUMMERY distinguished five groups of pruritus ani: (1) due to a general condition, such as glycosuria; (2) due to parasites; (3) secondary to some lesion of the anal region; (4) of old standing, with no local lesion discoverable; (5) paroxysmal pruritus. When a definite cause for the pruritus was discovered it was generally found to be one which produced a certain amount of moisture of a septic character, such as an ulcer. The removal of this, if the itching was of recent onset, gave permanent relief. Cases with a history dating back for more than two years were very difficult to cure, and even when a local lesion was discovered its removal seldom stopped the itching. He believed the change which took place in such long-standing cases to be fibrosis of the deeper layer of the skin, involving the nerve endings, and that it was brought about by a constant scratching and rubbing of the part. In 1912 Dwight Murray in America put forward the theory of a chronic streptococcal infection of the anal region, and the speaker believed this theory to be properly established. The first point in local treatment was strict attention to cleanliness and dryness. Powders were better than ointments or greasy applications. If a local lesion—such as piles or ulcer—was discovered, it should be removed, and if such a lesion was not discovered the patient should be put under an anaesthetic and a complete examination made. *X* rays, applied with suitable screens, would cure about 20 per cent. of the bad cases, and the cure was generally permanent; two or three applications were usually sufficient. He had seen some very bad burns, and in one case an epithelioma of the anus, result from *x*-ray treatment. When further measures were necessary there remained the operation first described by Sir Charles Ball in the BRITISH MEDICAL JOURNAL of January 21st, 1905. Ball's operation proved most satisfactory, but it was essential that the whole of the irritable area of the skin should be anaesthetized; the failures attributed to the operation were often due to missing some of the nerves. In performing the operation care must be taken to free the lining of the anal canal. The operation gave immediate relief and left no disability. Normal sensation returned completely within about six weeks. He had performed this operation in 59 cases. There had been a slight recurrence of itching in seven; in four of these this was cured by simple applications, and in the other three the operation was repeated, with complete success.

Dr. ARTHUR WHITFIELD said that a very large number of cases in adults—even middle-aged adults—were due to the oxyuris. The profession as a whole was not alive to the fact that threadworms were really very common. In one case, made temporarily quiet two years ago by *x* rays, the patient recently returned with a recurrence, and before recommencing treatment, he insisted that the patient should have thymol; on this being given, a large number of threadworms were produced. Cases almost always relapsed after *x*-ray treatment, and repeated doses lost their beneficial effect. When an obvious lesion was found and removed, a single dose of *x* rays might be useful. He believed that a great many burns and atrophies resulted from *x* rays. The most extravagant atrophy could be produced two years after the last dose had been given, even though no one of the doses had produced the smallest erythema or dermatitis. Among local applications greases should be avoided; lanoline was the worst grease that could be used, on account of its extreme tenacity and stickiness. He added that in a number of cases he had got the streptococcus from the anal tissue.

Dr. J. M. H. MACLEOD said that there were mild cases of pruritus ani which lasted a considerable time, and were due to causes of less importance than polypi or the presence of oxyuris in the rectum. Pruritus of a very troublesome character could be caused by congestion in the liver. A good many cases were due to general cutaneous affections. One case sent to him as pruritus ani proved, on examination, to be a case of psoriasis, with psoriatic patches on the knees and scalp. Another cause not to be lost sight of was ringworm, which was extremely common about the anal region. He had seen a couple of cases within the last year, sent to him as pruritus ani, which had the ringworm fungus. The rubbing and scratching caused secondary changes, sometimes a very marked thickening of the epidermis, and possibly the thickened epidermis pressed on the nerve endings and caused the spasms of pain which were so often found. He was not entirely favourable to *x* rays, but he had had a certain number of cases which did excellently, without recurrence so far as he knew. He gave usually three half-pastille doses, well spaced out.

Sir CHARTERS SYMONDS said that, local complications apart, the real basis of the trouble was a septic condition, and therefore he insisted on the utmost cleanliness and dryness after defaecation, and also wearing of some absorbent wool—salicylic wool had a special virtue—which must be frequently changed to prevent friction and diminish the evil effects of moisture. He thought the best remedies to be silver preparations, not nitrate of silver, but argyrol and protargol in 10 or 20 per cent. solutions.

Dr. N. S. FINZI said that before the cases came to the radiologist they should be investigated by a competent proctologist. Unless the cause was removed, the symptoms were bound to recur. When the cause had been removed or no definite cause had been found and the irritation continued, he thought that the theory of infection of the skin with the *Streptococcus faecalis* was very likely to hold good in such cases, and that here the treatment by

local measures such as $x$ rays would be a sound proceeding. His experience was that cases were nearly always relieved by $x$ rays at the commencement, but $x$ rays could not be continued indefinitely. His results with radium had been rather more permanent than with $x$ rays, although very similar otherwise. He had only used screened radium rays. If he was given the choice, and the irritation was not over too wide an area, he would prefer radium. He gave his doses of radium at intervals of six weeks, and he liked to give one further application after the disease had disappeared. There was still another procedure available for obstinate cases, supposing the patient refused to submit to Ball's operation, and that was the use of high frequency, applied with a vacuum electrode; in some cases this had a remarkable effect.

Sir CHARLES GORDON-WATSON said that there was one type of pruritus ani which he was inclined to regard not as surgical but as medical, like the pruritus associated with general constitutional diseases—namely, the pruritus occurring in the neurasthenic type of person. In such cases there seemed to be a strong hereditary tendency. In one case of father and son, both of whom were suffering from pruritus ani, he examined the son and found the dermatitis negligible and the anal canal perfectly healthy, with none of the fissures, ulcers, and haemorrhoids familiar in surgical cases. The surgical cases, he thought, ought to be divided into those which had an actual cause in the anus and those which had no marked disease or disturbance of the anus. When the cause was removed, if the pruritus had been only of short standing, the case could be cured for a certainty. In such cases ionization was of service, provided that all the elasticity of the skin had not disappeared. If the skin had not been changed into a kind of fibrous tissue but was still pliable, the cases responded well to ionization. In 28 cases treated by ionization (mostly zinc, but occasionally copper as well) every one experienced very great relief after the first treatment, and some needed no further treatment, though others went on to six or seven applications. Cases of paroxysmal pruritus were often to be referred to the neurasthenic class, but others were undoubtedly due to hypertrophied papillae. He had records at St. Bartholomew's Hospital extending over eighteen months of 86 cases of pruritus ani, in 53 of which there was one or more visible papillae. In the cases in which nothing was found but papillae the cautery was used, and in the majority a cure was obtained, in some cases certainly permanent after one application.

Mr. ASLETT BALDWIN said that when local conditions had all been excluded, the bowel should be examined by the sigmoidoscope. Many of these cases had a catarrhal condition of the bowel, and that was the cause of the chronic dampness of the anus. He had seen many cases relieved by ionization with zinc sulphate. Dr. W. M. FELDMAN also suggested a catarrhal condition of the bowel as the cause. The condition appeared to be hereditable; at least he had one patient whose father suffered from pruritus ani in a mild degree and whose maternal grandmother had pruritus vulvae in a severe degree.

Dr. FRANK COKE referred to work on protein sensitization, and said that in recent American literature he found two cases tested by skin tests, one giving a big reaction to potato and the other to pork, and on removing these articles from the diet or returning the patient to it, the condition disappeared or reappeared accordingly.

The PRESIDENT (Mr. Miles) thought that the term "pruritus ani" was unfortunate, because it signified nothing beyond the fact of itching. They should discriminate between a purely local condition—that is, a local dermatitis—and a dermatitis which, although it might occur in the perineal region, was part of another disease, such as psoriasis or eczema. He had always considered the chief cause of pruritus to be dampness of the perineal region and this he attributed to the hypertrophied glandular elements in the skin of that region. An analogous condition was hyperidrosis of the feet, which set up intense digital itching. The treatment was careful drying. Dampness by macerating the skin gave opportunity for [illegible] absorption. Hypertrophied papillae existed in the majority of cases of pruritus ani. One of the most predisposing causes of the condition was rectal constipation; when the faecal material was passing through the anal canal these hypertrophied papillae produced a spasm which cut off the act of defaecation and left a certain amount in the bowel. A very large proportion of cases could be cured by (1) drying the anal region with suitable powders, (2) ensuring that when the patient went to bed he did not go with a full rectum.

Mr. LOCKHART-MUMMERY, in reply, agreed that the anal papillae were often the cause of the trouble. As for sex incidence, the condition was rather more prevalent in men, but there was no great difference. He had tried vaccines, both autogenous and stock, and found them of no use.

## ALTERATION OF PRESENTATION AND POSITIONS IN LABOUR.

THE Glasgow Obstetrical Society met on March 16th, when Dr. ROBERT JARDINE gave a dissertation on "Methods of altering the presentation and positions before and during labour."

The operations were, he said, most frequently performed in the interests of the child, but were also often applied to facilitate labour and to spare the mother. He advocated examination a few days before labour to determine the position, which was then, as a rule, the same as that assumed during labour, if secondary face cases were excluded. Spontaneous alteration of position was very unusual at that late stage of the pregnancy, although not unknown. A transverse position found at such an examination should always be turned by external manipulations into a vertex or breech. In a primipara the external version should always be to a vertex, and this should be practised when a breech was found in a primipara. He had never tried to alter an occipito-posterior position to an occipito-anterior by external manipulations prior to the onset of labour, although this was possible. He made a plea for the more extensive use of abdominal palpation.

In occipito-posterior positions he did not approve of the rotation of the head by forceps, as he contended that the head was twisted on the neck while the shoulders were not turned. The treatment he advocated was manual rotation, aided by the external hand pushing the shoulder across, or, if this did not avail, the fingers of the vaginal hand were extended past the head, and the shoulder having been gripped, rotation was accomplished in this way. Rotation completed, he felt that it was advisable to apply forceps forthwith. Such cases ought not to be allowed to continue too long in labour. If the head was well flexed Milne Murray's straight axis-traction forceps, twice applied, were often satisfactory. In persistent occipito-posterior positions he advised attempt at rotation, trying first to one side, then to the other, on failure of which forceps delivery with the face to the pubis should be attempted despite the possibilities of perineal lacerations.

In face presentations it was advisable to leave all mento-anterior positions, except in cases where the head was very large, where it was advisable to convert to a vertex, at the same time rotating the occiput anteriorly. In all mento-posterior cases he thought that interference was justified. With a fully dilated os and unruptured membranes it was advisable to flex the head by manipulation *per vaginam*, and in cases with ruptured membranes manual dilatation of the os and flexion of the head was desirable before the face could become impacted. He advised immediate delivery with forceps after this manœuvre. All these he had found easy to perform except in primary face presentations, in which he considered version the line of treatment to be adopted. Persistent mento-posterior positions could only be delivered as such if the child was very small. Attempts could be made to push the head up in these cases and perform flexion, but failing this craniotomy was to be recommended.

The typical parietal presentations of flat pelvis were interesting. The anterior parietal positions he left to mould, and then delivered with axis-traction forceps in Walcher's hanging leg position. The posterior parietal positions, fortunately the less common, presented a greater difficulty. These could be converted to anterior parietal presentations if got early and before moulding, but were difficult to maintain in the new position. Delivery by forceps immediately on correction, if possible, was the best method of treatment. If the correction could not be maintained he advised version.

Transverse presentations with ruptured membranes were treated, with fully dilated os, by performing podalic

version; in back anterior cases the lower leg was taken, while in back posterior cases the leg to be taken was the higher one, thus bringing the dorsum anterior for the completion of the delivery. In cases attended by retraction and impaction decapitation was the correct treatment.

In cases of breech presentations with extended legs he felt that the delay was due not to the splint-like action, but to the presence of a retraction ring. The hand was to be forced gently past this, a leg swept inwards, and the child delivered by the application of *vis a tergo*.

At the conclusion of Dr. Jardine's address Dr. W. D. MACFARLANE read a communication on "Caesarean section as a method of treatment in central placenta praevia."

## CAESAREAN SECTION.

At the meeting of this Society on March 23rd Professor J. M. MUNRO KERR introduced a discussion on "The indications, limitations, and technique of Caesarean section."

A marked disproportion between head and pelvis and pelvic obstruction due to fibromyomatous or other tumour were, he stated, accepted as definite indications for Caesarean section. The advisability of its application in placenta praevia, eclampsia, toxaemia of the late months, cicatricial conditions of the vagina, congenital narrowing thereof, and delayed labour in elderly primiparae, was a debatable question until such time as surgical science could guarantee a sound uterine scar. The enlightened obstetrician would not be satisfied by sterilizing his patient, but would aim at the perfection of the scar, and to succeed in this he would have to give more careful consideration to such details as the suturing of the uterine wound, suture material, and, above all, the choice of a site in the uterine wall where the scar would be subjected to a minimum of strain. He referred to Dr. Eardley Holland's communication to the Royal Society of Medicine, and mentioned as of special interest the figures then submitted by Drs. Lindsay and Hewitt of the Glasgow Royal Maternity Hospital. From a review of ninety-four cases of Caesarean section, all unsterilized, they concluded that the liability to rupture in a succeeding pregnancy was 5.5 per cent., and that rupture occurred in 1.8 per cent.

The percentage of ruptures in a succeeding pregnancy could be reduced, he thought, but not in cases where the usual longitudinal incision was used. His reasons for not trusting to this incision were, first, that it was impossible to guarantee absolute asepsis; second, that during the puerperium the uterine muscle was in a state of autolysis, and thus interfered with healing; third, that the rough surface of the incised uterus did not approximate well, and permitted the collection of blood in small pockets thus formed; fourth, that the continual contraction and retraction of the uterus stretched the stitches, again permitting this pocket formation and blood collection. The necessity for the uterine sutures acting both as coaptors and haemostatic agents was another unsatisfactory state of affairs; they did not act efficiently in the latter capacity, failed to produce haemostasis, and healing was consequently imperfect. Above all, he attributed the weakness of the scar to the necessity to negotiate, at the first operation, a placenta placed anteriorly. In this condition the tissues were friable and over-vascular, the coaptation of the edges was particularly difficult, and blood collected between the stitch edges, with the result that a gutter formed on the inner surface of the uterus. In a subsequent pregnancy the membranes bulged into this gutter, formed a hernia, and ultimately led to rupture. These factors, he submitted, militated against the production of a reliable uterine cicatrix. He felt that the usual uterine scar could be improved; this could be done by such measures as practising prevention of sepsis, delivery of placenta *per vaginam*, to prevent the cervical portion of the membranes causing contamination; the operation should be performed at the most favourable time—for instance, at fairly full dilatation of the os in cases of contracted pelvis, or before labour in obstructive tumours; careful uterine suturing should be carried out, preferably in layers, catgut under the surface, fine silk or linen for the bulk of the muscle, and continuous catgut for the peritoneal surface, suturing during retraction, not contraction; there should be minimal massage of the uterus, and Fowler's position should be employed during the puerperium, as recommended by Martin of Glasgow.

An alternative method of Caesarean section, giving, in his opinion, a more satisfactory scar, was the lower uterine segment operation. In this procedure the abdomen was opened in the mid-line and the uterus exposed, a transverse incision was made through the uterine peritoneum just above the bladder, which was then pushed down. A transverse incision was made in the lower uterine segment, stay sutures inserted at each end of it, and the child delivered. The wound was then closed, with catgut suturing for the mucous membrane, linen for the muscle, and catgut for tacking back the bladder. The cicatrix resulting was, he maintained, less liable to rupture. The advantages of this method were that, cutting through a less vascular area the haemorrhage was less, the cut surfaces were thin, and therefore more easily approximated with accuracy; these parts were at rest during the early days of the puerperium, and thus healing was facilitated; finally, the scar was not subjected to strain until the labour was far advanced. He noted also the infrequency with which one encountered the placenta in this area. In conclusion, Professor Munro Kerr submitted that this method was a promising one for the formation of a more reliable scar, and said he felt hopeful that it would ultimately produce a cicatrix which could be thoroughly relied upon to resist the strain of a subsequent pregnancy and labour. Already in four cases the scar had stood this test.

Dr. DAVID SHANNON expressed the opinion that conservative Caesarean section was performed too frequently and without due consideration to the weakened uterus which resulted therefrom. The lower uterine segment method offered a means of producing a safer scar. He had had the opportunity of examining the lower uterine segment after a normal delivery succeeding this operation, performed some time previously by Dr. Kerr, and had found no trace of scar. He himself had performed the operation on twelve occasions with very satisfactory results; five of these cases had been extensively and frequently examined before admission to hospital. He felt that there was scope for the operation in those cases which were suspected of being infected, which were, as a rule, terminated by that deplorable operation, craniotomy on a living child, with its attendant grave maternal mortality and morbidity. He had not experienced any difficulty in the operation, and had in one of his cases delivered a 10 lb. child.

Dr. J. NIGEL STARK explained that his experience of Caesarean section was confined to the conservative operation, and the results, immediate and remote, had been satisfactory. There were objections to the lower uterine segment operation, on account of the tendency to tear laterally in the case of a large child or a malposition, and on the score of the proximity of the uterine wound to the infected vaginal canal and cervix. A placenta encountered during this operation would be a serious difficulty.

Dr. DOUGLAS M. LINDSAY had assisted at several lower uterine segment operations, and only once had he noted difficulty. In this case no stay sutures were inserted at the lateral extremities of the uterine wound, and a tear into the right side of the cervix resulted with haemorrhage difficult to control. The investigation made by him in conjunction with Dr. Hewitt had proved that on occasion a thoroughly sound scar could follow the conservative operation. In that investigation there were examples of normal deliveries, forceps deliveries, and craniotomies in pregnancies following Caesarean section.

Dr. HEWITT referred to one particular case of that series. The patient's first child had been delivered by Caesarean section, her second was a seven months child delivered by forceps, her third was a breech delivery at term, complicated by extended legs, and when she again reached term she was delivered again by Caesarean section. He alluded to the variation in the thickness of the scar noted at the second operation and to the presence of adhesions. In one case he had had to cut a thick vascular band binding the uterus to the anterior abdominal wall.

Dr. R. A. LENNIE mentioned repeated Caesarean sections, some of which exhibited no sign of scar and some the guttering described by Dr. Kerr. He would fear trouble in cases of large children being delivered through the limited incision possible in the lower uterine segment. Referring to suture material, he quoted two cases in which a stitch sinus had followed two years after Caesarean section. In both cases the material had been

silk, and in a third case he had removed seven inches of silk *per vaginam* eighteen months after Caesarean section. He preferred three silk sutures with a deep and superficial catgut.

Dr. HENDRY had realized the advisability of allowing labour to proceed far in order to have the lower uterine segment well developed. This made the operation more an emergency one than the conservative method, and solved the difficulty of the delivery of a large head. In one case he encountered a breech and his difficulty had been in deciding upon the size of incision to be made. It was advisable to deliver the uterus entirely from the abdomen to permit a hand being placed on the posterior cervical wall to aid the delivery of the head.

Dr. W. D. MACFARLANE expected that in "clean" cases the results following conservative Caesarean section would be as satisfactory as with the lower uterine segment method, while in "suspect" cases he thought the latter operation less satisfactory than Caesarean hysterectomy. As chairman he thanked Professor Kerr for his excellent and suggestive paper, and expressed the hope that at some future date further records of the new method would be submitted.

## NAEVI IN CHILDREN.

AT the meeting of the Harveian Society on April 14th a lecture was given by Mr. DUNCAN FITZWILLIAMS on "Naevi in children, and their treatment," illustrated by many photographs and sketches.

Mr. Fitzwilliams said that he had careful notes of 700 cases, and that he must have seen 300 other cases of which he had no notes or only fragmentary ones. He defined a naevus as a blood-vessel tumour—just as much a tumour as a chondroma—which spread by the capillaries. Of his recorded cases, 56 per cent. were superficial, 35 per cent. transitional, and 8 or 9 per cent. subcutaneous. The number of deep naevi was, of course, difficult to estimate, for they were found in the viscera and in organs, where they must remain undiscovered during life. Naevi occurred twice as frequently in girls as in boys. It might be thought that the relatively high female incidence in the cases coming for treatment was due to the greater solicitude of the parents for appearance in the case of a girl, but he did not believe that such solicitude had any sex distinction in the case of infants so young. It was said that naevi were either present at birth or appeared during the first year of life; his experience, based on 645 cases, was that naevi were present at birth in 83 per cent., appeared in the first six months in 13 per cent., and appeared at a later date in 4 per cent. Very often when it was said that a naevus only appeared after birth, the fact was that it had not been mentioned by the nurse and had escaped the attention of the mother until she herself came to tend her offspring. Naevi occurred on the head and neck in 49 per cent. of his cases; on the trunk in 29 per cent., and on the limbs in 21 per cent. The long axis of the naevus was found always to lie in the same direction as the nerve supplying the part.

If naevi were left to themselves he believed that some disappeared. In certain cases they would disappear by ulceration, while others ulcerated but did not quite disappear, leaving a spreading line of red capillaries. The cutaneous naevus should be treated without delay as soon as it was seen. If purely in the skin, it might be destroyed by $CO_2$ (carbon dioxide snow), being washed first with a little ether or iodine, and then subjected to the pressure of the snow pencil for thirty or forty seconds. If it was too big to be thus treated in one application the snow must be applied at more than one point, but care must be taken that the freezing areas did not overlap, and that they had unfrozen areas between them, if undue inflammation and scarring were to be avoided. Excision was of equal value to $CO_2$. An elliptical incision was made at right angles to the skin and into the subcutaneous tissue; the knife should never touch the naevoid tissue itself, or the bleeding, coming from spaces and not from vessels, would be difficult to control. Electricity was not very suitable for these cutaneous cases, and left more scarring than was necessary. In the transitional and subcutaneous type excision was the best method to adopt wherever possible, permitting removal of the tumour in one operation. The next best method was the use of the cautery, care being taken to destroy the growing edge of the naevus in the first place. The destruction of naevi by electrolysis was slow and to some extent unreliable. Both poles should be inserted in the naevus, not one pole at another part of the body. The lecturer closed with a reference to naevoid marks, port-wine stains, and congenital dilatation of the capillaries, which were not true tumours. For these $CO_2$ or electrolysis might be tried, the latter method being carried out with only the negative pole under the skin and the positive pole, a flat disc soaked in brine, applied quite near. In some cases a long tenotome or very thin knife might be inserted and the skin carefully under-cut.

A number of questions were asked at the close, and Mr. Fitzwilliams, in replying, remarked on the curious fact that children with naevi were mostly healthy children; in fact, he had never seen these children very ill with anything else. With regard to the possibility of vaccinating over the naevus, he had always understood that it defeated the object of vaccination if there was much bleeding; but he had vaccinated near the naevus, and when there was a good inflammatory result, a small naevus would disappear. He did not believe that a hereditary disposition to naevus had been established, though occasionally two or more members of a family were found to be affected.

# Reviews.

## THE INTERPRETATION OF SYMPTOMS.

SINCE the first edition, in 1909, of his *Symptoms and their Interpretation*,[1] Sir JAMES MACKENZIE has steadily continued his investigations into the mechanism and significance of the manifestations of disease, and accordingly this fourth edition, though arranged on the original plan and only thirty pages longer than the first, presents the results of his further studies, especially those from the St. Andrews Institute for Clinical Research, of which he is the director. The volume appears to have been passed for press last October, but it includes as an appendix, placed after the index, the author's paper on "The theory of disturbed reflexes in the production of disease," published in our issue of January 29th last, to which further reference will be made.

Sir James Mackenzie is a stern critic of loose thought, and in following his writings, as every practitioner of medicine should, the reader is apt to be haunted with the feeling that at any moment a cap may be presented that, unlikely as it might seem, exactly fits his head. Sir James's clear insight into the weak spots in the present state of medicine makes his message a wholesome if disturbing tonic to those who rest satisfied with its progress; for he insists that, though there is much laborious research and fresh symptoms are constantly being announced, the real need is for sound basic principles and the establishment of the laws governing the production of symptoms. Further, it often happens that what is supposed to be well known and commonplace is in reality so imperfectly understood that its true significance has been entirely missed. This applies particularly to the proper recognition of the mechanism of symptoms, in connexion with which "the laws of associated phenomena" should be given due weight, for in an illness there are various manifestations due to the causal agent disturbing many reflexes, and too often the most prominent of these symptoms is erroneously labelled as the primary morbid condition—for example, "the soldier's heart," or neurasthenia, is but one aspect of a diminished resistance to stimulation brought about by infection. A clearer knowledge of the mechanism of the less obtrusive symptoms would therefore facilitate the detection of the causal agent.

The study of symptoms is so ancient and familiar that it may appear a hard saying that at present symptomatology is in the same state of confusion as chemistry was before Dalton brought out the atomic theory, and that there is an urgent need for a classification of symptoms based on some law of nature that reveals the mechanism of their production. As the result of the recent conferences and work at the St. Andrews Institute, the conclusion—already foreshadowed in the early part of the volume—has

[1] *Symptoms and their Interpretation.* By Sir James Mackenzie, M.D., LL.D., F.R.S. Fourth edition. London: Shaw and Sons. 1920. (Demy 8vo, pp. 349; 8 figures. 15s.)

been reached that the vast majority of the symptoms of disease are disturbances of normal reflexes; thus the muscular rigidity in abdominal disease is an exaggeration of the normal reflex which maintains the tone in these muscles. The two main reflexes due to cardiac failure are breathlessness due to insufficient blood supply to the respiratory system, and pain from exhaustion of the myocardium; in some conditions these may occur together, in others one only is prominent; thus in auricular fibrillation the respiratory reflex is readily produced, whereas pain is rare. In angina pectoris there are multiple reflexes—namely, sensory, in which pain and hyperalgesia affect the chest, arms, head, and neck; motor, secretory and respiratory. The pain is a viscero-sensory reflex, due to a summation of stimuli; the sense of constriction is caused by spasm of the intercostal muscles, a viscero-motor reflex, analogous to muscular rigidity in abdominal disease, best seen in the elderly.

This new "law" of the disturbance of normal reflexes may appear simple, but at this stage it is difficult to estimate its future influence on medicine. Sir James Mackenzie has done so much for the advance of medicine that his assurance that its application in practice and in research has already shown it to be of service must carry great weight.

## MANSON'S TROPICAL DISEASES.

THE establishment of the study of tropical diseases as a settled part of medical discipline may properly be held to date from the publication in 1898 of a textbook on the subject by Dr. Patrick Manson.[2] It was reprinted three times within a year of its first appearance; a new edition was published in 1900; and a third edition, revised by the author, who had in the interval become Sir Patrick Manson, appeared in 1903. The work has maintained its position as the best general textbook on the subject, and the familiar dumpy volume has been the companion of English-speaking doctors in all parts of the tropics. The new, seventh, edition shows many changes: a larger page is used, so that, though the new edition contains no greater number of pages than the sixth, it nevertheless contains a good deal more matter. It is edited by Dr. PHILIP H. MANSON-BAHR, who has introduced much new material; in its selection he has had the advantage of the help and advice of Sir Patrick Manson himself, so that the transition from the original author to the new editor is made in the best circumstances.

The contents of this new edition are well arranged. Section I deals with the fevers; Section II with general diseases of undetermined nature; Section III with abdominal diseases; Section IV with the infective granulomata; Section V with animal parasites and associated diseases; Section VI with diseases due to poisons, including snake-bite; Section VII with tropical skin diseases; and Section VIII with local diseases of uncertain nature. There are three appendices, dealing with medical protozoology, medical helminthology and entomology, and laboratory methods as applied to clinical medicine in the tropics. The separation of the purely technical descriptions of the protozoa, helminths, and insects from the clinical part of the subject is convenient, as it avoids fatiguing the reader when he is studying the first part of the book. After completing this, he can then go to the appendices for details. All the articles have been brought up to date and are clearly written. Special mention may be made of the account given of the new work on the etiology of yellow fever, of the new chapters on infectious jaundice, and of that on typhus. The highly interesting discussion upon the diagnosis of fevers in the tropics indicates how much the modern doctor must now know in the way of laboratory tests for the diagnosis of disease, and with what care he must approach the subject if he is to form a correct estimate of the condition he is called upon to treat. The chapter on schistosomiasis is excellent, as are also those on dysentery; modern methods, of course, permit the differentiation of the different forms of this disease with an accuracy unknown even a few years ago.

The criterion of a work on tropical medicine at the present day must be judged by the extent to which it will prove of value to the student as a textbook, because the standard of the examinations for the various diplomas in tropical medicine is now very high, and calls for a thorough, accurate and up-to-date knowledge of all the scientific matters included in this branch of medicine. Having read the work with great care, we may state that it fulfils this criterion satisfactorily; it may therefore be recommended to the student working for his examination as well as to the tropical practitioner.

In a work containing so many details some errors are inevitable, but in this book they are few. Maurer's dots are not the same as basophilic granules, and it is more correct to talk of tertian fever as occurring every third day than every second. Such slips as these can easily be corrected in subsequent editions. This edition is illustrated by many excellent diagrams, drawings and coloured plates. There are ten new plates in colour and upwards of 150 new figures in black and white. The wise liberality of the publishers in this respect adds very much to the value of the book. It is an excellent work in every way, and may be confidently recommended to all interested in tropical medicine.

## THE LIPOIDS IN INFECTION AND IMMUNITY.

A CRITICAL review of the present state of knowledge concerning the part played by lipoids in infection and immunity is contained in a recent monograph by Dr. G. LINOSSIER of Lyons,[3] presented to the fourteenth French Congress of Medicine held at Brussels in May, 1920. As a result of his investigation of the literature, Dr. Linossier holds that it has still to be established that pure lipoids can act as antigens—that is, can give rise to specific antibodies; and also that the part they play in the defence has still to be adequately defined. This notwithstanding, it must be admitted that there is a strong probability that lipoids play a far more important part in both processes than is yet realized, and those who wish for a critical summary of the evidence at present available on this matter will do well to possess themselves of Dr. Linossier's suggestive little monograph.

## ORTHOPAEDIC APPARATUS.

IN *Gli Apparecchi Ortopedici*[4] Professor DELITALA has produced a handbook on orthopaedic instruments which should prove useful to Italian-speaking students and practitioners. Professor Putti of Bologna, who has furnished a preface, says that in Italy the study of orthopaedic surgery, despite the good work due to it in the war, is in a backward condition. There are few universities where it is taught and few hospitals where it is practised. Textbooks on the subject in the Italian tongue are wanting. (Professor Curcio's book on the same subject was published only this year.) The production of the excellent journal *La Chirurgia degli Organi di Movimento*, under Professor Putti's direction, has done much to raise the credit of Italian orthopaedics, and this is to be followed up by a series of monographs emanating from the Rizzoli Institute at Bologna, of which that now under notice is the first to appear. Professor Delitala is well known as an orthopaedic surgeon, and in this small book he has produced a useful guide in which he lays down the principles upon which all sorts of orthopaedic appliances should be made, describes the mechanism of the best known forms, and gives directions for manufacture. As might be expected, not only are steel and leather appliances described, but those of celluloid and other materials such as plaster-of-Paris, of which the technique is well set forth.

It is refreshing to find a book published on the continent of Europe in which a good deal of importance is given to the hip and knee splints of H. O. Thomas. It has been the custom of French and German writers to ignore these exceedingly valuable appliances, to the use of which so much of the successful treatment of fractures in the British and American forces in the late war was due. Perhaps the best things in the book are the articles on celluloid corsets and splints stiffened with light steels;

[2] *Manson's Tropical Diseases.* Edited by P. H. Manson-Bahr, D.S.O., M.A., M.D.(D.T.M. and H.)Cantab., M.R.C.P.Lond. Seventh edition, revised and enlarged. London and New York: Cassell and Co., Ltd. 1921. (Demy 8vo, pp. 976; 401 figures, 27 plates, 30s. net.)

[3] *Les Lipoides dans l'Infection et dans l'Immunité.* Par le Docteur G. Linossier. Paris: Baillière et Fils. 1920. (Pp. 108, 10 francs.)

[4] *Gli Apparecchi Ortopedici.* By F. Delitala. Bologna: L. Capelli. 1921. (Cr. 8vo, pp. 296 + xii; 248 figures. £1.)

a novelty is the use made of vulcanized rubber for splints for pseudarthrosis and flail-joint and other disabilities of the upper extremity. In this connexion Professor Delitala makes the interesting statement that, although caoutchouc will adhere closely to only one metal —namely, 18-carat gold—he has found that it will hold closely enough to aluminium, and that this metal, when entirely enclosed in vulcanized rubber, forms the best means of reinforcement. For the lower extremity celluloid and steel are preferred. In an appendix an interesting illustrated account is given of the workshops of the Rizzoli Institute, which cover a space of 1,500 square metres, a little distance from the main buildings.

It cannot be said that Professor Delitala's monograph is of equal value to the excellent little book of Dr. Ducroquet, *La Prothèse Fonctionelle des Blessés de Guerre* (reviewed in our columns June 28th, 1919, p. 800), but it approaches to it, and supplies in the Italian language a want which has not yet been adequately met in the English.

## "THE EXTRA PHARMACOPOEIA."

THE first volume of the new edition of *The Extra Pharmacopoeia*[5] appeared last June, and was reviewed in this JOURNAL on July 17th, p. 78. The second volume of the new edition, which is about to appear, is considerably larger than the corresponding volume of the last edition, but though it contains over 700 pages, yet it is of convenient size, and the increase in bulk is in part due to the inclusion of a complete index for both volumes. In the last edition the first volume contained the index for both parts, but the new arrangement of adding an index to each volume is a great convenience in a work of this nature, which is specially intended for rapid reference.

The first third of the volume deals with the chemistry of drugs, and contains information about tests for purity, methods of preparation, and tests for activity of drugs, together with tables of organic analysis. Analytical methods of special interest in public health are described in another part of the book, and descriptions are given of the methods of analysis of water, milk, and butter. The antiseptic power of disinfectants and the methods by which comparative figures are obtained are also described; under the heading "Nutrimenta" the bleaching and the adulteration of flour is described.

The sections of chief interest to medical men are those dealing with special methods of treatment and the descriptions of the chemical and bacteriological methods used in practice. All the latest methods of analysis of the blood, urine, faeces, and stomach contents are described, and full information is given concerning the preparation of dyes and culture media and the identification of micro-organisms.

The different portions of the volume are of special interest to different classes of medical men, but the following subjects may be specially mentioned because they are of general interest, and the recent information concerning them is given very fully: the therapeutic action of $x$ rays, electric currents, and ultra-violet light; the physical chemistry and therapeutic action of radium, and radio-active salts; the various chemical and physiological methods for the standardization of digitalis; the tests for renal function; and the determination of the reaction of the blood.

The book also contains a variety of other information which it is difficult to classify—such information as proprietary medicines and the composition of mineral waters, a list of British health resorts, and glossaries of medical terms in eight foreign languages. Moreover, abundant references are given to clinical and also to scientific literature.

Enough has been said to show how wide is the range of subjects covered in this volume. The authors have succeeded in compressing into one volume an excellent summary of all the clinical methods in general use, including all the most recent advances, and therefore their work is of particular value to those who desire concise information concerning these methods.

The special advantage of the book is that it contains easily accessible information about most of the laboratory tests used in clinical practice. The chief improvement that we can suggest is that the sections might be arranged in a somewhat more logical sequence; for example, the methods of analysis of blood, urine and faeces are given together, but the analysis of gastric contents is dealt with elsewhere; again, the analysis of water is separated from that of butter and milk by a description of the contents of mineral waters and a list of health resorts. The index is, however, very full, and therefore these irregularities in arrangement are not of any great importance.

[5] *The Extra Pharmacopoeia.* By W. Harrison Martindale, Ph.D., Ph.C., F.C.S., and W. Wynn Westcott, M.B.Lond., D.P.H. Vol. II. Seventeenth edition. London: H. K. Lewis and Co., Ltd. 1921. (Fcap. 8vo, pp. 688 + 32. 17s. 6d. net., 18s. post free throughout the world.)

## NOTES ON BOOKS.

THE address which the Hon. JOHN W. DAVIS, the late Ambassador of the United States, gave last January at University College, London, on *The Constitution of the United States*, has now been published from the University of London Press.[6] In this discourse is traced the history, modification, and development from its British sources of the American Constitution—"the most wonderful work ever struck off at a given time by the brain and purpose of man," as Gladstone described it.

In the seventy-four short poems brought together as *Thoughts of a Nature Lover*[7] Dr. KENNETH ROGERS shows a talent for verse that he has hitherto hidden from the world at large and a certain touch of pathos and meditative reflection on the fleeting years since he was at Temple Grove, Marlborough, and St. Bartholomew's Hospital. This is especially seen in the lines "To Savernake Forest," which he naturally regards "with a love unchanging from a vanished day," in the biographical "Retrospective," and in "Farewell to an old friend." In addition to the main theme, the joy of Nature, there are verses on various aspects of human nature, on the events of the war, and translations from the French and Italian. In "The captured German guns in the Mall" there is a pretty conception of these "spectres from an evil dream" which

> ". . . children now, with laughing Joys,
> Delight in them as wondrous Toys."

[6] *The Constitution of the United States.* By the Hon. John W. Davis. 1921. London: Hodder and Stoughton. (Demy 8vo, pp. 36. 1s. 6d. net.)

[7] *Thoughts of a Nature Lover.* By Kenneth Rogers, O.B.E., M.D. London: Holden and Hardingham, Ltd. 1921. (Cr. 8vo, pp. 125. 5s. net.)

## THE VOLUNTARY PRINCIPLE IN LONDON.

### INTERIM REPORT OF THE KING'S FUND POLICY COMMITTEE.

IN an article in the JOURNAL of February 5th last we gave a full account of the report by the Executive Committee of King Edward's Hospital Fund for London upon the policy to be recommended for the preservation of the voluntary system of hospital management and control. In accordance with that report the President and General Council of the King's Fund, on January 26th, passed a series of resolutions and appointed a special Policy Committee with the instruction to work out details of the policy and to take steps to recommend it to the Government, to Lord Cave's Committee of Inquiry, to the hospitals, and to the public. The Committee consists of Lord Stuart of Wortley (Chairman), Sir Cooper Perry, Viscount Burnham, Lord Somerleyton, Sir Frederick Fry, and Sir Alan Anderson.

At the last meeting of the President and General Council, held on April 12th, the Policy Committee presented an interim report, dated April 4th, which has now been issued. This states that written and oral evidence was submitted to Lord Cave's Committee in amplification and support of the statements contained in the Executive Committee's report and the resolutions of Council,[1] together with a further analysis of the figures supplied to the Fund by the hospitals in January.

*Financial Position at the end of 1920.*

While the income of the London hospitals had steadily risen since 1913, due mainly to the growth of voluntary contributions, the expenditure increased at a far greater pace. Thus the aggregate income from normal sources in 1920 was £2,447,000, while the expenditure was £2,841,000, leaving a deficit of £394,000, or about 14 per cent., on the

[1] Copies of the Policy Committee's Interim Report and of the thirteen resolutions passed by the General Council can be obtained from King Edward's Hospital Fund for London, 7, Walbrook, E.C.

working of the year. Emergency grants from the King's Fund and the National Relief Fund almost exactly wiped out that deficit, but these sources of income are non-recurrent. Accumulated bank loans amounted to £544,000 on December 31st, 1920. The individual differences between income and expenditure varied widely, of course, and from its study of these the Committee infers that the problem, though serious enough at the hospitals which have large deficits, ought not to prove insoluble.

*Alternative Remedies.*

Accepting the decision of the Council that voluntary contributions would need to be supplemented, at all events temporarily, by some other sources of revenue, the Committee has considered the various alternatives put forward. No final conclusions have been reached, but a solution is at present being sought along the following lines:

"The supplementary income must be adequate to meet the present deficits at hospitals that have deficits, without piling up surpluses at some hospitals and leaving others in difficulties; it must be capable of expanding to meet the cost of necessary extensions and developments; and it must not endanger voluntary management or the interests of the sick poor."

The choice could be narrowed down to two alternatives: (*a*) Payment in some form or other for specific work (which might include payment by means of voluntary or compulsory insurance); or (*b*) assistance from public funds proportioned in some way to voluntary contributions.

On the subject of payment by a method of voluntary insurance the Committee makes the following reference to the Sussex scheme, of which an account was given in our issue of January 22nd, 1921, p. 129:

"It is obvious that many patients who cannot pay during illness could, nevertheless, afford to make provision for hospital treatment by some form of voluntary insurance. A comprehensive scheme, associated with the name of Dr. Dill, has begun to be put into operation in Sussex; and a Committee of the British Medical Association has recommended its adoption, with modifications, by the hospitals of London. We are not at present prepared to endorse this scheme, especially as it has not yet been considered by the Hospital Saturday Fund."

After discussing the first alternative (*a*) in some detail, the Committee considers that both forms of insurance—voluntary and compulsory—should be thoroughly explored, in order to see whether the problem could be solved if the voluntary subscriptions of the charitable public were supplemented by a graduated system of patients' payments from those able to pay at the time of illness, and by insurance on the part of those who are unable so to do; the hospitals agreeing to limit free treatment, except in emergencies, to those unable either to pay or to insure.

The Committee has not as yet given consideration to the second alternative (*b*) of State or municipal assistance to encourage voluntary contributions. It thinks, however, that the principle of aid proportioned to voluntary contributions might have the advantage that it could be put into operation rapidly. Hence the possibilities of this alternative, either as a temporary expedient or as a permanent way of encouraging the maintenance of the voluntary system, should be investigated.

*Emergency Assistance.*

In view of the likelihood of a repetition of last year's crisis in hospital finance, the Committee notes that but for the emergency distribution of a quarter of a million by the King's Fund, some important London hospitals might have been obliged to close down or come on public funds. Should emergency aid again become necessary, it strongly deprecates any further depletion of the reserves of the King's Fund, except possibly by an advance with repayment guaranteed. Some other method, it is considered, would have to be found. One way would be by Government aid in some form wholly outside the sphere of permanent remedies; for instance, a payment towards the loss borne by the voluntary system in the treatment of service patients during the war. Another way would be by Government aid as an instalment of, or as an advance in anticipation of, some permanent remedy adopted by the time the crisis arose, but not yet worked out in detail or not yet put into full operation. Or, again, the recommendation already made by Lord Cave's Committee regarding surpluses now in the hands of the approved societies under the National Insurance Acts might possibly yield enough money in time to avoid any immediate collapse.

## THE USE OF ALCOHOL IN MEDICINE.

AT the annual meeting of the Society for the Study of Inebriety on April 12th, Sir ALFRED PEARCE GOULD presiding, a discussion took place on the use of alcohol in medicine.

Dr. H. H. DALE, F.R.S., in an opening address, said that it was difficult in any discussion concerning alcohol to preserve a perfectly objective and scientific attitude, but he thought they could agree that their views on the social significance of alcohol had no bearing on its status as a remedy. It ought to be possible to hold the opinion that alcohol in daily life was harmful and at the same time feel no obligation to discredit alcohol as a drug when properly prescribed. A great deal of unnecessary heat had been wasted over the question whether or not alcohol was a food. The question was primarily one of nomenclature. If by food was meant a substance which by its combustion in the body could liberate energy, the claim of alcohol to rank as a food in that sense was beyond dispute. But that did not in the least imply that alcohol was a proper or desirable food for a healthy man; that must be determined on other grounds, and he doubted whether anyone would now be found to advocate the replacement of so much carbohydrate or fat in the normal diet by alcohol. But in the case of the sick the conditions were different. It became in that case relevant to remember that alcohol differed from all the other constituents of diet, save glucose, in that it was ready for absorption and use without preliminary digestion. In severe febrile and acutely toxic conditions in which the secretion of the digestive ferments was more or less in abeyance, it did seem that alcohol might have some advantages as an emergency food; and the effect of alcohol on the brain and central nervous system, which forbade its use as a proper substitute for other foods in health, did not in his opinion contraindicate its use in the case of the sick. Its action in weakening the critical judgement and blunting the fine edge of sensibility, however much this might lead to the lowering of efficiency in the ordinary business of life, might be and in many cases was all to the good when dealing with a restless, anxious, and fever-stricken patient. The sedative effect of alcohol might be as important as its food value in such cases. In one other direction alcohol might be regarded as an abnormal food—namely, in the preliminary period of starvation in the modern treatment of diabetes, when it was very necessary not to give the patient anything which he could possibly convert into sugar. The one source of energy which could be given without vitiating the treatment was alcohol. Dr. Mellanby had told him of one business man who had had to give up his work on account of diabetes because a diet low enough to keep his urine free from sugar was insufficient for the energy needs of an active life; but that patient was able to resume his work and again lead a normal existence as the result of adding to his diet a measured, properly prescribed ration of alcohol, which, alone of all possible foodstuffs, supplied the missing units of energy without leading to renewed excretion of sugar. But such cases had nothing whatever to do with the old port wine tradition. The prescription of alcohol for convalescent or weakly patients who were able to take ordinary foods was a very much more doubtful and difficult subject. From the experimental point of view he found it hard to believe that alcohol had any special value in such conditions, except in so far as by making the patient more comfortable, and rendering him less sensitive to the tedium of convalescence, it might indirectly improve his appetite, and thereby improve his digestion and assimilation. He had been told that the cases in which the giving of alcohol during convalescence had led to the alcohol habit were few or unknown, but that was only a small aspect of the subject; it was a much more serious danger that the casual recommendation of stout or port wine in such circumstances, on the basis of a not yet extinct faith in its efficacy for building up the system, might reinforce with the weight of medical opinion the natural desire of the laity to believe that what they liked was good for them.

As for the supposed value of alcohol as a stimulant, the verdict of experimental pharmacology had for some years been clear. He believed that the basis for the idea that alcohol was a cardiac and respiratory stimulant was the reflex effects of its action on the buccal and oesophageal

mucous membrane, an action which it shared with ammonia, for instance, in smelling salts. This action accounted for the great preference which people had for brandy over other forms of alcohol, and old brandy in particular. He believed, however, that there was room for a systematic investigation into the action of alcohol in abnormal conditions in which the heart was weak and the blood pressure low, in order to settle the question whether there was anything, after all, in the claim that alcohol had a stimulant action on the circulation. The experiments which seemed to negative a stimulant action on the heart and respiration had been carried out on normal animals and man, and the possibility remained that it might have some stimulant action on functions abnormally depressed, which those experiments had missed altogether. If such an effect existed, there was at present no evidence to warrant them in assuming its existence. As for the value of alcohol in promoting digestion, while there was experimental evidence that alcohol would cause a rather profuse outbreak of gastric juice, the juice in question was not the normal juice, but a fluid low in acidity, and very poor in gastric ferment. Any effect which alcohol might have in promoting digestion must be due to its action in relieving anxiety or the effects of pain or fatigue.

Dr. Dale concluded by deprecating two attitudes towards the therapeutic use of alcohol: one, that alcohol was a mysterious fortifying substance which would build up the constitution, and could be prescribed without danger and with probable advantage; the other, that because it was a dangerous thing for the public to use, its rational use in medicine was to be avoided.

Dr. O. LEYTON described some experiences with alcohol in the early stages of the starvation treatment of diabetes. It appeared that, after some period of semi-starvation, patients managed to adapt themselves to the limited diet, even though alcohol was not continued; either the body acclimatized itself to the small supply of food, or else the patients learned to utilize cellulose. He had not sufficient evidence to show that it was necessary for alcohol to be continued indefinitely in this treatment of diabetes. He believed with Dr. Dale that the only way in which alcohol could improve digestion was by altering the state of mind, not by any direct action on the stomach.

Sir ROBERT ARMSTRONG-JONES said that he had found alcohol to have a definite hypnotic effect in some cases of acute mania, and in that condition it was eliminated from the skin better and more quickly than in melancholia. In juvenile melancholia and senile depression the prescription of alcohol was inadmissible. He had had 330 cases of general paralysis of the insane under his care while resident at Claybury, and he had seen a number of private cases, and he had to record no good effect from the administration of alcohol. In cases of acute delirious mania, puerperal insanity with rapid exhaustion, the free administration of alcohol was often the only thing that would save life. He had tried various stimulating diets, but dry wine in the shape of dry sherry or moselle had saved lives when nothing else had availed.

Professor RANSON said that experimental evidence proved that when the respiratory centre was depressed the effect of alcohol was to depress it still further. Alcohol was not a stimulant to respiratory action, unless reflexly from the mouth.

Mr. ARTHUR EVANS said that during the last two years at the London Temperance Hospital he had done 254 operations, with 12 deaths. The deaths were practically inevitable from the nature of the cases. Alcohol was given in no instance. He claimed that the statistics of 44,000 patients admitted since the foundation of the hospital—to only 136 of whom, mostly cases of pneumonia, was alcohol given—compared well with those of other institutions.

Sir A. PEARCE GOULD, from the chair, in closing the discussion, remarked that the withholding of alcohol in the cancer wards of the Middlesex Hospital and the administration of morphine with a much more sparing hand than formerly had added greatly to the patients' comfort.

A NEW medical faculty has recently been established at Recife, in the government of Pernambuco, so that there are now seven medical faculties in Brazil. As the country possesses 35,000,000 inhabitants, this number of medical schools is considered to be hardly sufficient.

## THERAPEUTICS OF RADIUM.

### ANNUAL REPORT OF THE LONDON RADIUM INSTITUTE.

THE annual report of the London Radium Institute for 1920 is constructed on a different plan from its predecessors. The details of cases are confined to a table, and Mr. Hayward Pinch, F.R.C.S., who has been its medical superintendent since the Institute was founded ten years ago, devotes the body of the report, which fills nearly thirty pages, to a discussion of general questions which will be of direct value to others who are doing clinical work with radium or desire to form their own opinion of its value.

After a short account of the physics of radium rays he discusses their action on normal tissues, and from a brief review of the pathology of the diseases treated passes to a consideration of the reasons which should determine the selection of the class of irradiation to be employed and the length of exposure to be given to produce a destructive or stimulant effect, as may be necessary. A statement as to the absorption of beta and gamma rays prepares the way for particulars of the screening to be used to obtain rays of different qualities. The screens used for therapeutic purposes are of a thickness which does not absorb more than a small percentage of the gamma rays, but stops a percentage of the beta rays ranging from practically all to only 3.7 per cent.

In practice the use of radium is governed by the knowledge that has been acquired as to the action of the several sorts of rays on the elements of healthy tissues and of diseased structures. The alpha rays are particulate, travel relatively slowly, and are so little penetrating as to possess no therapeutic value. The beta rays, negative electrons travelling with a velocity of the order of that of light, are of the type of $x$ rays and, like them, present a considerable range of penetration, so as to be divisible into "soft" beta rays, stopped by 0.2 mm. of aluminium; "medium," which pass through this thickness of aluminium but are stopped by 0.2 mm. of silver; and "hard," which pass through this thickness of silver. The gamma rays, of the same type as the most penetrating or hardest $x$ rays, are only slightly diminished by the most absorptive screens used for therapeutic purposes; they easily penetrate the skin and reach the internal organ. The beta rays do not penetrate far, the hard being reduced to about 6 per cent. by 1 cm. of body tissue. Beta rays unscreened are used in the treatment of epitheliomata which tend to fungate and not to invade the tissues; for those that so tend the soft rays are cut out and medium and hard rays only used.

As a general principle it may be assumed that radium rays stimulate growing cells, the effect being the greater the more rapidly the cell is growing, until stimulus is replaced by destruction: in lympho-sarcoma the destruction may be so rapid that the patient suffers from well-marked symptoms of toxaemia with rise of temperature to 101° to 102°. On the other hand, cells of fibrous tissue may be just sufficiently stimulated to form bands or tracts of such tissue, and in this way continuance or spread of the malignant cellular growth may be hindered. Growths of mesoblastic origin are more susceptible than those of hypoblastic or epiblastic origin; between the two last named certain differences are to be observed, the former being more readily influenced by short exposures to large quantities of radium salts, the latter by long exposures to small amounts.

*The Skin.*

The effects produced in some normal tissues and organs by exposure to beta and gamma rays are reviewed. In the skin the first effects are proliferation and then enfoliation of the epidermis, congestion of the dermis with degeneration of hair follicles and sebaceous glands, multiplication of the connective tissue cells, forming a plexus which almost obliterates the normal fibrous and elastic tissue, and proliferation of the lining cells of the blood vessels (embryonic regression). Eventually the fibroblasts become arranged in parallel layers containing a relatively large number of elastic fibres, so that the scar is soft and supple. Regeneration of the hair follicles and sebaceous glands takes place also. The proliferation of the cells of the blood vessels is followed, if the radiation be prolonged and intense, by degeneration and leucocytic infiltration. Milder radiation for short periods at long intervals leads to fibrosis of the walls; it is in this way that the cure of angiomata is induced.

*The Blood.*

Periodical examinations have been made of the blood of nurses and laboratory workers at the Radium Institute, who are subject to frequent short exposures to the gamma radiation. Dr. J. C. Mottram, Director of the Research Department, has observed at first a slight diminution in the number of red cells, accompanied by a rise in the colour index. If exposure to radium continues, the increase is succeeded by a decrease both in the number of red cells and in the haemoglobin until both have fallen to 50 per cent. or lower. The more important effect is on the white cells. Leucopenia invariably occurs; the white cells, Mr. Pinch states, are frequently reduced to half the normal proportion, the reduction falling chiefly on the polynuclear leucocytes and the lymphocytes. The effect is slowly produced, but is very persistent, and it may be many months after complete withdrawal from radium work before the percentage again becomes normal. In a paper published last December,[1] Dr. Mottram described three deaths among radium workers, two in England and one in France; in all three aplastic pernicious anaemia was present and in two death was ascribed to this condition; in the third there were signs also of infective endocarditis.

The association of mild anaemia of the pernicious type as above mentioned with these three cases of profound aplastic pernicious anaemia led to the conclusion that the important etiological factor was exposure to radium and indicates a direct action of the gamma rays on the bone marrow. This suggestion was tested by exposing rats to varying amounts of gamma radiation; when their bone marrow was compared with that of normal animals the number of mitoses in the radiated animals was found to be smaller, indicating a decreased output of blood cells. During 1920 the workers at the Institute were better protected, and by February, 1921, the blood condition had reverted to the normal.

Radium rays quickly produce a profound effect on the spleen; the connective tissue increases, the cellular elements diminish, and there is an almost complete disappearance of lymphocytes; concurrently the proportion of polynuclear and large mononuclear cells in the blood is greatly decreased, and there is an accumulation of red corpuscles in the bone marrow and many small haemorrhages into its substance.

*Dosage.*

Mr. Pinch devotes rather more than half of the space his report occupies to consideration of the mode of applying radium in the treatment of various forms of disease in which the method has proved of value. The question of dosage is, of course, of very great importance; for, if the dose be too weak, the pathological cells, instead of being checked or destroyed, may be stimulated to increased activity, whereas if the dose be excessive, destruction not only of the morbid, but also of the normal cells occurs, resulting in great loss of tissue and the formation of an intractable ulcer or fistula. For full details the report itself must be consulted; we can only summarize the recommendations and indicate their general nature.

Reference has already been made to the treatment of epitheliomata, but it may be added that tubular epitheliomata characterized by long, finger-like columns of cells running at right angles to the skin surfaces and permeating the subcutaneous tissues should, it is advised, be treated almost entirely by gamma radiation, since 94 per cent. of the beta radiation is absorbed by one centimetre of tissue, and these growths often extend much more deeply. Cross-fire radiation—the apparatus being so applied that the focus of their combined radiation corresponds with the centre of the growth—should be adopted. The exposure should be prolonged in a series for twenty-four to thirty hours, and the series repeated at intervals of not less than four weeks. A screen of two millimetres of lead, which cuts off practically all the beta rays, should be used.

*Spheroidal-celled carcinomata*, the most common and typical form being cancer of the breast, may be beneficially affected, especially in spare women who have passed the menopause. In such a patient, possessing a fair inherent power of resistance, the growth in its earliest stage shows on microscopical section all transitions from a dense central scirrhotic focus to a comparatively medullary condition at the periphery. In the former there are but few cells and much connective tissue; in the latter connective tissue fibres are scanty and malignant cells predominate. The object of treatment by radium is to reinforce Nature's attempt at the arrest of the disease. Prolonged gamma radiation diminishes the vitality and arrests the proliferation of the malignant cells, but stimulates the multiplication of the fi roblasts. It is not sufficient to radiate the primary growth, equal attention must be paid to the surrounding lymphatic areas.

*Columnar-celled carcinomata*, the most common site for which is the intestinal canal, are difficult to treat with radium, both on mechanical grounds and because they originate in a mucous membrane with a submucosa abundantly provided with lymphatics, so that infiltration speedily occurs. Gamma radiations from screened applicators have been used for carcinoma of the stomach, small intestines, and colon, but little real benefit has been observed. In the rectum, however, direct application is possible; if the tumour be small and exuberant a screened emanation tube may be inserted into its substance. If the growth be annular, the introduction within the lumen of a powerful tube of 150 or 200 mg., screened with 2 mm. of lead, for eighteen hours may diminish the rate of growth and lead to healing of the ulceration, lessen the existing circumjacent infiltration, and render the condition operable.

*Sarcomata* are best treated by gamma irradiation; large quantities of radium should be used and the applicators disposed so as to secure equal intensity of radiation in all parts of the growth; often this is best accomplished by burying one or more radium tubes, screened with 1 mm. of silver, in the centre of the mass. Powerful applicators, screened with 2 mm. of lead, should be applied over and around its circumference. The reaction that may be produced owing to the rapid destruction of the sarcomatous cells has already been mentioned.

In *melanoma* (melanotic sarcoma), which is believed to arise from the pigment cells of the corium, and to be, therefore, of epiblastic rather than mesoblastic origin, beta rays may be used to produce an intensely destructive reaction. In such cases the lymph channels leading from the primary focus should at the same time receive prolonged gamma radiation, in order to destroy any foci that may be present.

*Rodent ulcer* is, for clinical purposes, recognized to occur in two forms: in the first, of a hypertrophic and exuberant type, with slight superficial ulceration and a distinct rolled edge, the prognosis is good. Unscreened apparatus emitting beta rays is used for one to three hours, according to the density of the lesion. The rolled edge is evidence of a considerable degree of resistance to the disease, and the irradiation recommended produces degenerative necrosis of all the malignant tissue and possibly of a small layer of the normal tissue. The stimulant action of the gamma rays induces rapid multiplication of the fibroblasts, and the resulting scar, though slowly produced, is smooth, soft, and supple. Growths of the excavating type, with thin overhanging edges and a soft gelatinous base, form the second class. The absence of a rolled edge shows that the defensive powers are deficient and the prognosis is not so good. A smaller dose must be used, and it must extend beyond the visible margin in order to deal with outlying invasive columns of cells. Recurrence is, however, very frequent. In long-standing cases, with great destruction of the tissue and invasion of the mucous, cartilaginous or bony tissues, the beta rays should be cut off. Radium irradiation of any kind is powerless to cure rodent ulcer of bony tissues, and has little influence on that of cartilage. Affected portions of these tissues should, therefore, be removed before radium treatment is begun. Gamma irradiation applied to the borders of the growth and its deeper processes will often arrest the progress of the disease, diminish the pain, and induce some slight degree of repair.

*Endotheliomata*, met with most commonly in connexion with the parotid gland, but sometimes observed in the submaxillary gland and carotid body, can often be usefully treated by gamma rays. If the growth be inoperable it should be treated by cross-fire, using heavily screened external applicators emitting gamma rays only, supplemented by the insertion of a radium tube screened with 1 mm. of silver into the centre of the growth for twenty to thirty hours.

In *uterine fibro-myomata* radiation may be used when

[1] *Archives of Radiology and Electrotherapeutics.*

the patient objects to surgical operation. When haemorrhage is the principal symptom relief may confidently be anticipated from the introduction of a 100 mg. tube, screened with 2 mm. of lead and rubber, into the uterine cavity, supplemented by a plate of equal strength, screened in a similar fashion and applied externally over the fundus. Exposure of twenty-four hours should be given, to be repeated, if necessary, after three months. The treatment causes exfoliation of the hypertrophied and congested uterine mucous membrane, which is afterwards replaced by healthy cells, together with proliferation of the endothelial cells of the enlarged uterine blood vessels and perivascular fibrosis, leading eventually to endarteritis obliterans. Treatment cannot be counted upon to diminish the size of the tumour unless it be of the soft myomatous vascular type. In a patient nearing the climacteric it may be proper, with her consent, to attempt to produce premature menopause by supplementing irradiation of the uterine cavity by prolonged irradiation of both ovaries with powerful screened applicators.

*Spleno-medullary leucocythaemia* in the early stage may be greatly benefited by gamma rays, using flat applicators containing from 200 to 500 mg., screened with 2 mm. of lead, for twenty to thirty hours. This is usually followed by a reduction of 50 per cent. or more in the white blood cells and a decrease in the size of the spleen. If extensive fibrosis of the interstitial tissue of the spleen has already taken place, as may happen after much treatment with $x$ rays, no great decrease in the size of the organ can be expected, but the number of white blood cells may be considerably reduced. The treatment may have to be repeated in two or three months.

*Lymphatic leucocythaemia* is often benefited by irradiation with gamma rays for periods of from twenty to thirty hours. A decrease in the number and percentage proportion of the leucocytes occurs, and may persist for two months or more, but the ultimate prognosis is bad.

*Exophthalmic goitre* may be materially benefited by exposures to about 200 mg. of radium, screened with 2 mm. of lead, for a total period of twenty-four to thirty hours; temporary exacerbation follows, but is succeeded by improvement associated with fibrosis of the connective tissue of the thyroid.

*Tubercle bacilli* in cultures are not killed by an exposure of less than at least 100 hours to radium rays, but shorter radiation is believed to diminish their vitality, and it is thought that the beneficial effect observed in lupus is brought about in this way. If ulceration has not occurred, applicators screened with one-tenth of a millimetre of lead, which cuts off three-fourths of the beta rays, may be used for two or three hours, and repeated at intervals of about six weeks; no breach in the skin is produced, the congestion and induration are much lessened, and after repeated exposures the skin becomes apparently normal. If the patch of lupus is ulcerated but superficial, with little accompanying induration, an unscreened exposure of an hour or an hour and a half, utilizing practically all the beta rays, produces a destructive reaction of moderate degree, which is followed by the formation of a smooth and supple scar. In lupus of long standing with extensive ulceration and destruction, screening with 2 mm. of lead, yielding the gamma rays only, for a total exposure of twenty to thirty hours is preferable. In tuberculous adenitis cross-fire irradiation may be of use if caseation has not taken place.

In *capillary naevi*, whether "spider" naevi or port wine stain, screening with 0.1 mm. of lead, which allows the hard beta rays as well as the gamma rays to pass, should be used to produce proliferation of the endothelial lining of the vessels; their slow constriction follows the gradual development of fibrous tissue from newly formed fibroblasts. The treatment of cavernous naevi by radium is commonly very successful, and should be undertaken as early as possible, even in infancy.

### CHEMICO-PHYSICAL LABORATORY.

Mr. W. L. S. Alton, F.I.C., Director of the Chemico-Physical Laboratory of the Institute, gives an account of the method in use for separating radium emanation in a condensed form for therapeutic purposes.

Dr. Mottram reports that the Medical Research Council has lent 220 mg. of radium to the Research Department.

## ROYAL MEDICAL BENEVOLENT FUND.

### ANNUAL MEETING.

THE annual meeting of the Royal Medical Benevolent Fund was held on April 5th, when Sir Thomas Barlow, Bt., President, was in the chair.

The annual report showed an increase of £530 in donations and subscriptions over the previous year, while the amount distributed in grants and gifts was £4,021, as against £3,897 in 1920. Attention is called to the fact that the annual grants which the committee can allocate depend upon the amount of donations and subscriptions received, and all friends of the Fund are urged to make its wants more widely known, preferably by personal canvass. Owing to the diminished purchasing power of money, it is essential that the average grants should be considerably increased. The annuitants numbered 178.

The War Emergency Fund had made grants amounting to £5,926, and had thus rendered invaluable assistance to a large number of medical practitioners who on demobilization had found themselves on return to practice unable to carry on without such help. The committee had already agreed to bear the cost of the education of twenty-five boys and girls at public schools, and they would welcome applications for such purpose on behalf of any who are eligible for help from the fund. The total sum received for the fund was £34,818, and the amount expended was £18,920.

The committee express their thanks to the editors of the BRITISH MEDICAL JOURNAL and the *Lancet* for their great assistance in publishing reports, and to the Medical Insurance Agency for its gift of £375 towards the general expenses.

The following officers were re-elected: *President*, Sir Thomas Barlow, Bt.; *Treasurer*, Sir Charters Symonds; *Honorary Secretary*, Dr. Newton Pitt.

### COMMITTEE MEETING.

At the meeting of the Committee held on April 12th twenty-nine cases were considered, and £397 voted to twenty-six applicants. The following is a summary of some of the cases relieved:

Widow, aged 67, of M.D.Dub. who died in 1918. Applicant was left entirely without means. She has five grown-up children, but none of them are able to help her. Since the death of her husband she has paid rent—15s. a week—by selling her furniture. Two sisters, now dead, used to clothe and help to support her. Voted £12 in twelve instalments.

Widow, aged 61, of M.R.C.S.Eng. who died in 1915. Applicant asks help from the Fund owing to the recent death of her eldest daughter, who was her chief support. Her only income is derived from letting rooms. Son only receives 9s. a week as an engineer's apprentice, and has still another eighteen months to serve. Voted £10.

Widow, aged 87, of L.F.P.S.Glas. who died February, 1921. Applicant's husband was granted £30 in six instalments from the Fund. Applicant is now left with only the old age pension, and her rent is 7s. a week. Voted £26 in twelve instalments.

Daughter, aged 54, of M.R.C.S.Eng. who died in 1873. Owing to ill health and an operation in November last she is now incapacitated and is dependent upon her sister who earns her living as a dressmaker. Applicant is entirely without means. Voted £18 in two instalments.

Daughter, aged 59, of M.R.C.S.Eng. who died in 1892. Applicant worked for nineteen years as a church worker in Wales, but owing to partial blindness and ill health has had to give it up. The Royal United Beneficent Association allows her £25 per annum. She also receives a little help from the Guild and a grant from the Fund for the last ten years. Relieved ten times, £135. Voted £18 in twelve instalments.

Subscriptions may be sent to the Honorary Treasurer, Sir Charters J. Symonds, K.B.E., C.B., F.R.C.S., at 11, Chandos Street, Cavendish Square, London, W.1.

The Royal Medical Benevolent Fund Guild is overwhelmed, in these days of exorbitant prices for clothing and household necessaries, with applications for coats and skirts for ladies and girls holding secretarial posts, and suits for working boys. The Guild appeals for second-hand clothes and household articles for the benefit of the widows and children who in happier times would not have needed assistance. The gifts should be sent to the Secretary of the Guild, 43, Bolsover Street, W.1.

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A CERTAIN amount of confusion exists with regard to the date of the first use of ether for producing surgical anaesthesia. Dr. W. W. Keen was made recently to say that it was first employed for this purpose on September 30th, 1846. The story was correctly reported in the BRITISH MEDICAL JOURNAL of October 17th, 1896. On the date mentioned Dr. T. G. Morton, a dentist, used it with complete success for the extraction of a tooth. Ether was first used for a surgical operation on October 16th, 1846, when Morton gave ether for Dr. John C. Warren in the Massachusetts General Hospital; the operation was for a congenital vascular tumour of the neck.

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## AURICULAR FIBRILLATION AND FLUTTER.

IN the Oliver-Sharpey lectures, of which the report is completed in this issue, Dr. Thomas Lewis has described an attempt to ascertain the nature of certain grave disturbances of the human heart beat. The attempt has succeeded, and the solution is presented in the lucid manner characteristic of the lecturer. After years of patient investigation, aided by able and painstaking assistants, he is now confident that he has at last solved the riddle of the disorderly action of auricular fibrillation and the rapid and varying ventricular rate in auricular flutter. That this is of very great practical importance is obvious in view of the fact that auricular fibrillation is the most common cause and frequently the immediate cause of cardiac failure.

Fibrillation of the auricle was first recognized as a clinical entity by Sir James Mackenzie in 1890. It was he who appreciated the specific nature of its disorderly action and how it differed from the other arrhythmias, but he was not then in a position to state the essential nature of the happenings in the auricles. At first he was inclined to the view that the auricles were simply distended and paralysed. Later he held that the auricles and ventricles contracted simultaneously in response to an irregular stimulation originating in the auriculo-ventricular node; the term nodal rhythm was employed to indicate this form of arrhythmia. This view in turn had to be abandoned when, in 1910, it was demonstrated by means of the electrocardiograph that the state of the auricles in these patients was identical with a condition produced experimentally even so far back as 1887, and termed auricular fibrillation. In Dr. Lewis's two lectures we have the final explanation of this important cardiac disorder.

Normally, the contraction of the auricles is a co-ordinated movement, occurring regularly. The stimulus originates in the sino-auricular node or pacemaker, and initiates a response in the auricles. Dr. Lewis shows that the action of the auricles is fundamentally different when flutter and when fibrillation occurs. The normal pacemaker is side-tracked, and a peculiar "circus movement" begins. In this movement the wave of contraction travels in a circular path, and constantly passes over the same ground. In order to form a clear conception of this mode of auricular activity it is essential to remember that, following every contraction of the auricular wall, the myocardium becomes refractory. This refractory stage persists for a varying time, and when it finally passes off the fibres are sensitive and responsive. When circus movement is present a wave of contraction is continuously circulating. The crest of this wave is always chasing its own wake across a gap of responsive tissue, and so long as there is this area of responsive muscle fibre in front of the advancing wave it continues to progress. It is obvious that this gap, both in its extent and also in the degree to which it has recovered its responsiveness, is of extreme importance. As Dr. Lewis indicates, if that gap could be closed, the circulating wave would come to an abrupt termination and permit the normal pacemaker to resume control of the heart.

Auricular flutter and fibrillation are both shown to be due to the same type of abnormal contraction of the auricles—namely, circus movement. There are, however, certain important differences in the action of the auricles in these two conditions. In fibrillation the rate is about 50 per cent. higher than in flutter, and the action is not regular.

The explanation of these differences is the most fascinating section of the lectures. It is shown that the higher rate in fibrillation is due to the fact that the path of the circulating wave is shorter than in flutter. In many cases of flutter the "mother wave" encircles both venae cavae, while in fibrillation the ring of muscle fibres around the opening of the superior vena cava alone may be involved.

The reason for the irregular action in fibrillation is to be found in the condition of the responsive gap already mentioned. With the very rapid rates of contraction in flutter and fibrillation there is a decrease in the duration and quality of the responsive phase, and a condition of partial refractoriness develops; this interferes with the progress of the advancing wave of contraction. In fibrillation this barrier becomes pronounced, and the rate of the onward movement of the wave varies, producing the disorderly rhythm of the ventricles so characteristic of fibrillation of the auricle.

Prolongation of the refractory state produces a corresponding reduction of the gap. This indicates the lines along which further investigations must take place, and we may look forward to the time when we shall be in possession of remedies which, by increasing the refractory period and closing the gap, will break the vicious circle underlying both flutter and fibrillation. The foundations for such further investigations have been well and truly laid.

## THE PREPARATION OF SCIENTIFIC PAPERS.

ONE of the crosses the medical journalist has to bear is the curious disregard of the literary amenities displayed by a large number of the members of the medical profession who send communications for publication. Perhaps the majority have now become aware that when writing for the printer only one side of the paper should be used; but many have not advanced to this stage. It is common for a surgeon to send in a bundle of sheets of paper of various sizes, fixed together with a safety-pin and containing, mixed up with the text, rough diagrams and bedside charts perhaps sprinkled with notes and defaced by blots and corrections. Such slovenliness is, of course, inexcusable. But writers who are prepared to take more trouble may still be guilty of the most unscientific lack of attention to details. To have a manuscript typewritten, and then to send it for publication without revision is a crime comparable to operating with unwashened hands; yet the Medical Research Council finds it necessary to insert a warning on this head among the "Notes upon the preparation of monographs and reports for publication" which it has recently issued. A comparable fault is failure to write proper names and technical terms legibly. It was said of Lord Brougham that he had three distinct handwritings—one that the majority of people could read, one that his clerk could read for a fee, and a third that had to be sent to the printer—and, undoubtedly, an experienced compositor acquires an extraordinary skill in deciphering careless writing. But he ought not to be put to the test; if the author's manuscript has been

typewritten and is uncorrected, or the correction is illegible, the skill and experience of the compositor is of no avail.

The next point made by the Medical Research Council is that footnotes as a general rule are not desirable; with this we agree; a footnote generally means that the author has not sufficiently digested his matter. It used to be a fashion with historians to print copious notes, and remonstrance was met by reference to the practice of Gibbon; but his notes, when more than references to his authorities, usually contained matter which he judged it becoming to veil in the decent obscurity of a dead language.

Another point is one to which we have several times called attention. "The decimal point," the Council says, "should never be placed at the beginning of a number, as when so placed it may well be overlooked by the compositor; for example, the form 0.5 should be used, not .5." Then, again, much trouble would be saved if authors would remember that "tables should be prepared on separate sheets and numbered consecutively in the order in which they are to be used in the text." Instructions to the printer as to where the tables may best be inserted should be given at the proper place in the text. Such instructions cannot always be carried out in the case either of tables or diagrams, owing to the size and shape of the page; therefore, when referring in the text to tables, the number of the table should be quoted, and such phrases as "the following table" avoided. Next, with regard to illustrations, diagrams, or charts, the Medical Research Council points out that they should never be drawn on the manuscript or typescript, for they have to be sent to the engravers. "Underlines," legends or descriptions, however, are sent to the printer, so that each drawing or diagram should be numbered. A drawing should be made in Indian ink on stout paper (Bristol board); in order to save time and diminish correspondence an underline bearing the same number should be attached to it or written on the back, and complete lists of all drawings, arranged in numerical order, with copies of the underlines should be appended to the manuscript or typescript. The Medical Research Council, while stating that it will, "of course, exercise its discretion as to the number and cost of illustrations," lays it down that their number should be reduced to the minimum necessary for the elucidation of the text, and that line drawings should be employed in preference to wash drawings or photographs, as the cost of line blocks is about half that of half-tone blocks, which, moreover, must usually be printed separately on special paper, multiplying the total cost by five or six. Coloured illustrations should be avoided, their cost is prohibitive in these times; yet we have known authors send in a chart in three colours, a chart which, in the case of the BRITISH MEDICAL JOURNAL, would probably have cost at least £100 to print, whereas the same effect and contrast could be obtained in black and white. Photographs are, as a rule, the least desirable methods of illustrating a scientific paper; from 15 to 25 per cent. of detail is inevitably lost in the process of reproduction, and the inclusion of inessential details in the background leads to confusion. Line drawings, as has been said, are far better; they should be drawn on a large scale, and can then be reduced during the process of reproduction to a convenient size; the author, however, must remember that any reference letters or numbers will be correspondingly reduced, and therefore should be drawn large. The author should not insert any words in ink on drawings, diagrams or charts; such indications should be put in very lightly in pencil, allowing a skilled draughtsman to give them their final form.

The concluding section of the Notes deals with scientific names of animals and plants. These names, as is well known, are formed according to the binominal or Linnaean system; for the manner of their use international rules exist, and it is illiterate not to abide by them. The specific name must be written with a small initial letter; thus, *Bacillus typhosus*, not *Bacillus Typhosus;* further, "Specific names should not be employed alone, but should always be preceded by the full name or initial capital letter of the genus to which they belong; for example, write *Bacillus coli* or *B. coli*, not *coli*." This touches on the use of laboratory slang; it may be all very convenient in a laboratory, but it has no general sanction, and may easily be misunderstood by workers in another laboratory, or by those whose laboratory experience has been left some years in the past. In zoological nomenclature specific names should be written with a small initial letter, even when they are formed from names of persons or places—thus, we should write *Trypanosoma brucei*, not *Trypanosoma Brucei*. Unfortunately, the botanist uses an initial capital letter when the specific name is derived from that of a person; for example, he would say *Phlox Drummondii*, not *Phlox drummondii*. Since bacteria are included in the vegetable kingdom, the same convention might be applied to them, but the Medical Research Council expresses the opinion that the specific names of micro-organisms should be written with a small initial letter; for example, *B. welchii*, not *B. Welchii*. Finally, we would quote, since it can neither be improved nor abridged, the concluding paragraph of the Notes: "Generic names are frequently used as common English nouns denoting classes. In such cases the name should be written in roman and not italic type, without an initial capital; for example, 'large numbers of bacilli and amoebae were found in the specimen,' not '. . . of *Bacilli* and *Amoebae* . . .' (The latter statement would mean that many different species belonging to the genera *Bacillus* and *Amoeba* were found.)"

## PERSISTENCE OF GASTRIC ULCERS AFTER PERFORATION.

IT is very generally held that a gastric or duodenal ulcer which has perforated will after operation give rise to no further trouble. The common practice of simple suture of such a perforation is based on this belief. A minority is of the opinion that perforations of duodenal and gastric ulcers do better if a gastro-enterostomy is made at the same time. There can be no denial of the fact that the satisfactory infolding of a perforated ulcer, typically a small perforation in the centre of a relatively large indurated area, leads to a very definite deformity. The wonder is that so many cases should apparently suffer so little physiological upset and actual obstruction following the operation. A certain proportion—and just what that proportion is it would be interesting to know—do suffer from persistent dyspepsia after closure of their perforations. (Two out of Farr's[1] twenty-one patients who recovered after perforation came to gastro-enterostomy for pyloric stenosis.) Lewisohn[2] discusses this interesting question, and records four cases, seen within two years, in which re-operation became necessary owing to recurrence of symptoms. Of these, two were duodenal, one gastric, the site of the fourth not being ascertainable owing to adhesions. The absence of cure after perforation is well shown by another case, in which an ulcer that had perforated and been sutured gave way a second time,

[1] Farr, C.: *Ann. Surg.*, p. 591.
[2] Lewisohn, R.: Ibid., November, 1920, 595.

necessitating immediate operation. It may be argued that these cases are rare, that the usual post-perforation course is generally much happier and more benign. Lewisohn believes that a gastro-enterostomy at the time of suture obviates these ill results, whilst not in any way reducing the percentage of recoveries. The author has carried out this practice in 8 cases without a death, and refers to Deaver's larger series (25 cases with one death). The surgeon will obviously have to use his judgement in selecting cases suitable for immediate gastro-enterostomy. In cases of perforation seen late, in large perforations with extensive peritoneal soiling, in cases in poor general condition, the old saying of "Quick in and quicker out" is the only possible advice. But in early perforations with limited extravasation of gastric and duodenal contents it will often be well to do a gastro-enterostomy as soon as the perforation has been satisfactorily closed and the ulcer buried. This method of treatment finds its happiest field of application with duodenal and juxta-pyloric ulcers. It is now recognized that ulcers of the stomach at a distance from the pylorus cannot be infallibly cured by gastro-enterostomy. Partial gastrectomy and pylorectomy are the operations of choice here. But he would be a bold man who would perform the last two operations upon patients with perforated ulcers. Such bold men do, however, exist, for Gauthier[3] has performed pylorectomy with posterior gastro-enterostomy and jejuno-jejunostomy on a man 56 years old suffering from a perforation, six hours old, of a callous ulcer of the stomach.

## THE NEW SERIES OF THE "INDEX MEDICUS."

WITH the appearance of the first quarterly part of the first volume of its third series the *Index Medicus* breaks away from tradition in several respects. Instead of being a monthly *catalogue raisonné* of medical works (books, articles in journals, pamphlets, etc.) with an annual alphabetical index of its own contents, it becomes a quarterly alphabetical list without an annual index, each part being, so to say, its own index. This is the change stated generally, and it would seem, therefore, as if once more the alphabetical index has defeated the *catalogue raisonné*, and remains in possession of the field; but this is not completely so—traces of the subject-arranged system remain, at any rate, for a time. For instance, Dr. Fielding H. Garrison, one of the two editors, in order to orient the reader who is used to the older arrangement, gives a grouping of the various subject-rubrics under such headings as Anthropology, Bacteriology, Biology, Climatology, Dermatology, and so on. This list, which occupies the first two or three pages of the quarterly part, will, it would seem, appear at least for a while, until custom has familiarized the new plan of consultation. In this small alphabetically arranged *catalogue raisonné* there is a sort of rudimentary survival of the prevailing plan with which so many were familiar in the first and second series of the *Index Medicus*. Under "Hygiene," for example, in this small preliminary grouping, there are found the following headings, any one of which may be found in other parts in its alphabetical place: Abattoirs, air, dust, factory workers, flour, food, habitations, health insurance, heating, hygiene (industrial), hospitals, marriage, meat, etc. The editor has thus shown his real desire to prevent any serious jar in the change of gearing in his bibliographical automobile. Further, at the conclusion of each year (four parts), an alphabetically arranged index of authors is to be supplied. Three changes on the title-page accompany these internal rearrangements—the word "quarterly" takes the place of "monthly"—namely, *Index Medicus: A Quarterly Classified Record of the Current Medical Literature of the World*; a joint editor's name appears—namely, Albert Allemann, M.D.; and "third" is found instead of "second" series. Of the change in system J. W. B. sends us some comments which may be summarized as follows: "The alphabetical system of arranging the subject-rubrics now adopted is not free from inconvenience. Closely related matters are separated sometimes by the whole length of the alphabet, and a remarkably active intelligence is necessary to exhaust all the possible headings under which a reference may reasonably be expected to appear. Then, again, comparatively unimportant subjects have the same largeness of type and amount of space allotted to them as many much more outstanding matters. Some rubrics are almost useless as they stand, such as *Girls* (*Defective*), under which one finds a reference to a paper on 'Girl Guides and the Welfare of the Defective Girl'; the mysterious *Orbitopagus* has the same typographical rank assigned to it as, say, *Ointments*; and a paper on *Digestion* is not likely to be looked for under the rubric *Onions*. Every new drug that the chemist finds a name for and that the enthusiastic practitioner gives a trial to at once springs into prominence by the system adopted here. The fact is that modern medicine is a very difficult subject to index, and whilst the method now employed may do away with some of the inconveniences of the former plan, it will introduce others of a new kind. At the same time it makes for rapidity of consultation with perhaps a slight lessening of exhaustiveness in the result obtained; the balance is therefore, perhaps, rather in favour than against the change. There is one distinct advantage: the systems in use in the *Index Catalogue* and in the *Index Medicus* are thus unified. Of these two publications the latter is in a sense the more important, for it gives access to the most recent additions to that storehouse of medical literature. America, the Carnegie Institution of Washington, and the editors deserve well of all English-speaking peoples for providing guides so trustworthy to the literary contributions constantly being made in all lands to the art and science of medicine. To the medical teacher, to the research worker, to the writer of book or article, to the specialist, and to the practitioner who wishes to keep abreast of the times, the *Index Medicus* is the only absolutely complete *vade mecum* to the literature of his subject. By its means, and with access to a good medical library, he may at first hand consult the original papers on any matter which may be exercising his mind. It gives him the titles, and much may be learned even from a title." In this connexion it will not be without profit to quote what Dr. Garrison says about titles. He says, re-echoing a remark made by Dr. Fletcher, at one time editor of the second series, "there are titles which may be unassignable under a strict classification"; and he continues: "this is especially true of titles which have no true centre of gravity—for example, those in which two or more ideas are exploited with equal weight, or in which two or more disparate diseases are brought into causal or other relations, or in which the true intention is not apparent, even from the text of the book or article itself." Editors of medical periodicals know only too well such obscurely named articles, and not a few really important discoveries have been lost to view through such faults in terminology. Dr. Garrison closes his prefatorial notes with a sentence of good advice: "the simple rule of Billings (the first editor of the *Index Catalogue* and *Index*), 'Give the paper a proper title,' commends itself equally to medical authors, editors, and publishers."

## THE COCKROACH.

THE latest addition to the series of economic pamphlets issued by the Trustees of the British Museum is that on *The Cockroach*,[1] by Mr. Frederick Laing, Assistant in the Department of Entomology. This disgusting creature, which, as every schoolboy knows, is neither black nor a beetle, and neither cock nor roach, has often been under

[3] Gauthier: *Bull. Mém. Soc. Chir. Paris*, October, 1920, 1145.

[1] *The Cockroach: Its Life-History and How to Deal with It.* By Frederick Laing, M.A., B.Sc. London: Printed by order of the Trustees of the British Museum, and sold at the British Museum and by B. Quaritch, Ltd., and Dulau and Co., Ltd. 1921. (Demy 8vo, pp. 18; 2 figures. 6d.)

suspicion as a carrier of disease, but the verdict hitherto has been "not proven," save in so far as it acts as a secondary host to a nematode, *Spiroptera neoplastica*, which in certain circumstances can produce cancer in rats. With this part of the story of the cockroach, which was very fully related in our columns, Mr. Laing does not seem to have made himself sufficiently acquainted. Possibly, however, future research may incriminate the cockroach further, and it seems reasonable to suppose that the creature may infect food over which it crawls. Its only useful functions are that it removes dead animal matter and that it eats bed-bugs. Mr. Laing writes most attractively, and within the compass of 18 pages describes the habits and life-history of the common cockroach, of the misnamed German cockroach, and of the two other species—the American and the Australian—occasionally found in warehouses and hot-houses in this country. The most effective methods of getting rid of these domestic pests are set out in a practical manner in the concluding section. The illustrations could scarcely be bettered.

## ABLATION OF OVARIES IN MAMMARY CANCER.

FROM time to time cases have been reported in which a remarkable retrogression of cancer of the breast has been observed after removal of the ovaries. The earliest cases, so far as we know, were two reported to the Edinburgh Medico-Chirurgical Society by Sir George Beatson in 1896, and recorded in our columns on June 6th of that year. The most recent of the kind seems to be one reported to the Académie de Médecine on March 2nd by Dr. Henry Reynès of Marseilles. He had had a case in which the same treatment was tried in 1904. His new case is that of a woman aged 45, in whom the menopause had not occurred. She was suffering from very advanced cancer of the breast; it was ulcerated and adherent to the chest; there were numerous enlarged glands in the axilla, and great oedema of the left upper limb. The local condition was quite inoperable. The ovaries were removed on October 1st, 1920; improvement immediately began, the ulceration healed, the breast became movable and the axillary glands, as well as the oedema of the arm, disappeared. The general condition, which had been very bad, cachexia being marked, greatly improved. A local operation for the removal of the tumour could have been performed, but the patient is very satisfied with her condition. In his comments Dr. Reynès suggested that in such a case arrest of the ovarian function might be brought about without operation by exposure to *x* rays.

## THE GORGAS MEMORIAL.

SURGEON-GENERAL WILLIAM C. GORGAS, of the United States Army, died at the Queen Alexandra Military Hospital in London on July 4th, 1920. He had been taken ill while passing through this country on his way to the West Coast of Africa to investigate the prevalence there of yellow fever, a disease with which his name will ever be associated. The funeral service was held with full military honours in St. Paul's Cathedral; the body was then conveyed by an American warship to the United States and buried at Arlington, near Washington. In October last we stated that as a memorial to General Gorgas it had been proposed to establish in Panama an international institute for research in tropical diseases. It has now been announced by Rear Admiral Braisted, of the United States Navy, that plans are afoot to broaden the scope of the Gorgas Memorial Institute at Panama, so that it may be a research and teaching institute of international scope. According to our contemporary, the *Journal of the American Medical Association*, three American medical men are about to proceed to Panama to put the plan into effect as soon as the preliminary organization work is complete. The intention is that they shall begin research work in tropical medicine under the superintendent of the hospital. Later the institute will have its own building adjoining the hospital, in front of which will be erected a statue of General Gorgas. Among the other institutions engaged in teaching and research in tropical medicine which have expressed their willingness to co-operate in furthering the aims of the Gorgas Memorial are Harvard and Johns Hopkins Universities, the Rockefeller Foundation, the University of California, the London School of Tropical Medicine, and the Liverpool School of Tropical Medicine. A more appropriate memorial could scarcely be conceived for the medical administrator who abolished yellow fever and malaria from the Panama Canal zone, and so made possible the construction of the great inter-oceanic waterway.

## THE CHINESE RED CROSS SOCIETY.

AMONG the reports on national Red Cross societies presented to the recent International Conference at Geneva was one on the Chinese Red Cross Society. It is from the pen of Dr. B. Y. Wong, of the medical department of the Central Committee at Peking. It deals with the history of the society during the last ten years. During the first revolutionary outbreak in 1911 funds were raised in Shanghai, and Red Cross detachments were sent to Hankow under the direction of Dr. S. M. Cox, with Dr. B. Y. Wong as his adjutant, and also other centres of revolutionary activity. Another detachment was sent from Peking, under the leadership of Dr. J. C. Ferguson and Dr. Gibb, of Peking Union Medical College. In addition to attending to the wounded and rescuing the inmates of a blind asylum, the detachment raised burial corps, which were of great service. Much Red Cross work was done also at Nanking under the direction of Dr. Osgood. The society was again active during the civil war of 1913; it also came to the rescue of the population during a series of floods, the first due to the overflow of the river Wye, the second of the river Yu, and a third to a very serious inundation of the province of Fengtien. During the great war the society had few opportunities of being useful, but it gave aid during the Japanese operations against the Germans, and also at Vladivostock, where a hospital was established and nearly 17,000 patients treated. In 1918 Admiral Tsai was appointed vice-president, and the reorganization of the society was undertaken, but was interrupted by the call for help during the recent great famine in five densely populated north-western provinces. The society has three hospitals at Shanghai. One of these is the General Hospital, conducted in association with the American missions. It is a substantial building of red brick with stone foundations, on a site about two miles from the business centre of Shanghai. Cases are transported to it in motor ambulances; it is intended for the reception of serious cases, both surgical and medical, and is provided with a good operating theatre. The other two hospitals are on a smaller scale, but between them provide accommodation for over 300 cases. The society also has a small infectious hospital, which is open during the summer when cholera and intestinal disorders are prevalent.

## AN ASTHMA CLINIC.

THE report of the Medical Board of the New York Hospital for 1920 states that in March of that year a special out-patient clinic for the study and treatment of asthma and hay fever was opened under the charge of Dr. Robert A. Cooke. This class, which is held twice weekly, has rapidly grown, so that from sixty to eighty patients are now treated at each session, and there is difficulty in providing adequate quarters in the limited space at the disposal of the out-patient department. The permanent value of this work cannot as yet be estimated, but the results so far attained are regarded as most encouraging and in striking contrast to those of former methods of treatment. Working on the assumption that such

conditions as asthma and hay fever are usually manifestations of a peculiar idiosyncrasy or hypersensitiveness on the part of the individual to certain substances taken into the body by inhalation or as food, the first stage in the treatment is the identification of the special substance or substances to which each patient is sensitive. This is accomplished by observing the local effects of the injection of extracts of a great variety of these substances into the patient's skin, in the manner described by Mr. Frank Coke in our issue of March 12th, 1921. If and when the offending agent is identified an effort is made to protect the patient from further exposure to it, or, should this not be possible, to immunize him against it by repeated subcutaneous injections of minute doses of its extract. Nine months' experience at the New York Hospital asthma clinic suggests that in the majority of asthmatic patients the trouble is due to the inhalation of the dandruff from the fur, feather, or hair of domestic animals. The growing work of this clinic has made heavy demands upon the subdepartment of immunology of the Pathological Department for the preparation of extracts of the various substances used in the diagnostic tests. As many as 130 substances are employed, and much skill and ingenuity have been needed to prepare extracts which are not only potent, but sterile and safe for inoculation. The importance attached to environment in the causation of many cases of asthma has led to the appointment of a social service worker to visit the homes and workshops of the patients and aid in carrying out the therapeutic measures advised at the clinic.

### THE RÖNTGEN SOCIETY.

THE Silvanus Thompson Memorial Lecture of the Röntgen Society is to be delivered by Dr. A. V. Hill, Professor of Physiology in the University of Manchester, at the annual meeting of the Röntgen Society on May 19th; the subject of the lecture will be "Electrical instruments and phenomena in physiology." The society will hold its first meeting out of London at Manchester on Friday, May 6th, at 8 p.m., when, as already announced, Professor W. J. Bragg, Langworthy Professor of Physics in the University of Manchester, will read a paper, and Professor A. V. Hill will give a demonstration. On the following day visits will be paid to works in the district. The society's annual exhibition will be held at the house of the Royal Photographic Society, 35, Russell Square, during June. Dr. Robert Knox, the president of the society, offers silver and bronze plaques as prizes for the best and second-best collection of four prints, the work of an assistant employed at a hospital or working for a qualified radiologist. This section will be open to persons who are not members of the Röntgen Society. The inaugural meeting of the Institute of Physics, which members of the Röntgen Society are invited to attend, will take place at the Institute of Civil Engineers, Great George Street, Westminster, on April 27th, at 6 p.m. The President, Sir Richard Glazebrook, K.C.B., formerly Director of the National Physical Laboratory, will be in the chair, and Sir J. J. Thomson, O.M., will deliver an address. It is hoped that Mr. A. J. Balfour will be present and take part in the proceedings.

### PATHOLOGICAL RESEARCH APPLIED TO MEDICINE.

IT has been arranged to give during the summer session a course of lectures at the Institute of Pathology and Research, St. Mary's Hospital, London, on pathological research in its relation to medicine. The first lecture will be given by the Principal, Sir Almroth Wright, M.D., F.R.S., on Thursday next, April 28th, at 4.30 p.m.; subsequent lectures will be given on the same day of the week and at the same hour. Among the distinguished men of science who have promised to take part in the course are Sir James Mackenzie, M.D., F.R.S., Professor W. Bulloch, M.D., F.R.S., Professor G. Dreyer, M.D., F.R.S., Dr. Leonard Hill, F.R.S., Dr. H. H. Dale, F.R.S., and Dr. J. A. Murray, Director of the Imperial Cancer Research Laboratories. The course will be open to all members of the profession and students. The full programme giving the subjects of each lecture will be published shortly.

### EMERGENCY AMBULANCE PLANS.

IN view of the recent threat of a strike of railway men and transport workers the Home Service Ambulance Committee of the Joint Council of the British Red Cross Society and the Order of St. John instructed the county directors that the fullest use should be made of the ambulances, both for the assistance of the authorities in dealing with casualties and for the maintenance of hospital supplies in the event of the failure of other transport facilities. In the instructions issued as regards the use of the ambulances in connexion with any disturbances, it was requested that regard should be had to the maintenance of the ordinary work of the vehicles, and that such arrangements should be made for co-ordination between adjacent ambulance stations that the least possible inconvenience should ensue to the hospitals and patients of the areas served. It was stipulated, with the concurrence of the military authorities, that the ambulances must remain entirely under the control of the county directors and must not be driven by enlisted men.

DR. HENRY HEAD will deliver the Croonian Lecture before the Royal Society on Thursday, May 5th. The subject is "Release of Function in the Nervous System."

PROFESSOR FREDERICK GOWLAND HOPKINS, M.B., F.R.C.P., F.R.S., who has been professor of biochemistry in the University of Cambridge since 1914, has been appointed to the newly-founded Sir William Dunn chair in that subject. The total amount of Sir William Dunn's benefaction for the establishment of an institute of chemistry was £165,000; of this, £25,000 was set apart for the endowment of the chair, and £10,000 to provide a salary for the second in command; £60,000 was to be spent on the erection of suitable laboratories, leaving, it was hoped, an income of about £3,000 a year for research and upkeep.

OWING to the threatened railway strike the Congress of Radiology and Physiotherapy, which had been arranged for April 14th, 15th and 16th, could not be held. At a meeting of the Executive, held on April 20th, it was decided to postpone the congress until next spring.

## Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

### Post-Graduate Instruction.

THE Committee appointed by the Ministry of Health, with the Earl of Athlone as chairman, to consider the question of post-graduate instruction in medicine, has held a number of meetings and is approaching the completion of its work. It is not expected, however, that the report will be ready before next month.

### Tuberculosis Bill.

*Second Reading in the Commons.*

Sir A. Mond, on April 13th, moved the second reading of the Public Health (Tuberculosis) Bill, the object of which is to enable the county and county borough councils to take up, as from April 30th, responsibilities for sanatorium treatment for tuberculosis, this being the date on which the duties of the Insurance Committees in this matter under the National Insurance Act of 1920 are ended.

*Minister's Statement.*

The Minister reminded the House that the county and borough councils had already been responsible for a large number of tuberculosis cases, and had treated many insured

and non-insured cases within their areas. It was therefore proposed in the bill that these authorities should act in respect of both insured and non-insured. Arrangements have been made in accordance with schemes or agreements approved by the Minister of Health or his predecessors, and Clause 1 of the bill provided that such arrangements should for its purpose be deemed adequate. Of the 145 county and borough councils in England and Wales 124 have acted, and the bill placed no fresh obligations upon them. Of the remaining 21, all but one had made some provision for the treatment of tuberculosis, but in two or three cases the provision extended only to dispensaries, and in others the arrangements of the councils for treatment in sanatoriums or hospitals did not provide fully for insured persons. In these cases the Insurance Committee at present met directly the needs of insured persons. He understood that the small number of councils who had not yet fallen into line were ready to do so if they understood that the obligations were statutory. In order to prevent the possibility of any local authority failing in its duty, there was a power in Subsection 2 of Clause 1 by which the Minister in such event might make adequate arrangements and charge the authority with it. This power was really a precaution.

Touching on finance, Sir A. Mond said he knew that some doubt had been felt whether the powers given under Clause 2, Subsection 1, might not be used in such a way that if at any time the Exchequer contributions diminished the Minister might impose great burdens upon the local authorities. That was not intended, and if so desired he should be pleased to consider an amendment to remove that doubt. Power was to be given to local authorities to co-opt on their committees members from the Insurance Committees which had been doing such good work. To compel this course to be taken would, he thought, very much defeat the object in view, but he looked forward to invitations being given and to harmonious co-operation. He read a letter he had received from the Association of Municipal Corporations. A subcommittee who had considered the bill accepted the co-option provision only because it was optional. They would, it was stated, strongly object to this provision being made compulsory. Sir Alfred added that some doubt was manifested whether the position of the Welsh National Memorial Association was met under the bill. He was assured that it was, but would be ready to insert any further amendment to make the matter absolutely certain.

Mr. Ormsby Gore, in welcoming the measure, believed that the county and borough councils were willing co-operators but bad servants if the Ministry attempted to drive them. The campaign against tuberculosis required strategy. One of the lacunae was that tuberculosis was notifiable since 1912 to the district medical officer, but he had to pass on his information to the county medical officer, and he had to treat it as confidential. Thus his action was frequently restricted, although he was more responsible than anyone else for administration. It was very desirable to get over this administrative difficulty. After-care also wanted far more attention. The Government would, he was sure, be well advised to encourage the county councils administering the bill and the medical officers of health to stimulate in every way research and reports upon their experience, both scientific and administrative, so as to get every one keen on stamping out a disease of this kind. It was most important that officers who had been engaged in administering sanatorium benefit, with seven or eight years' personal experience of the working of it—medical and lay—should not be suddenly turned off into other occupations. He thought that some indication should have been given in the bill that there would be some continuity of employment, as far as possible, for officers who had administered the benefit in the past.

*Debate.*

Mr. R. Richardson, on behalf of the Labour Party, also welcomed the bill. As to the scheme generally, he held that matters should not be left so much to the local authorities. This was a national question, and the expense ought not to be thrown on the local authorities. It was broadly correct to say that the poorer the area the more prevalent was this disease and the less able were the people there to cope with it owing to their financial position. The greatest defect of the bill was as regards after-treatment. It ought to be an instruction to every local authority that it must have an After-care Committee. That committee should include upon it the medical officer of the local authority or some such person. Every local authority ought also to provide an open-air school for all children suffering from the disease, where pure milk could be provided.

Lieut.-Colonel Raw commended the bill for several reasons, but for two in particular. One was that tuberculosis was preventable and should not exist in any civilized country, and the second was that it was curable. At present there were in England over 600,000 persons attacked by tuberculosis. England alone suffered in deaths between 50,000 and 60,000 persons per year from tuberculosis. He was certain that the health authorities were most anxious not only to give the very best treatment to those suffering from tuberculosis, but to take every possible means, backed up by the Minister of Health, to prevent it spreading. He agreed that the clause to enable members of Insurance Committees to be co-opted should be mandatory and not permissive. Local committees should have the power to appoint an After-care Committee—a statutory committee to see that the patient was enabled to carry on, in some degree, the sanatorium treatment. He suggested that the most important problem was the wage-earning power of the man or woman afflicted. A man attacked by this disease was, in the best of circumstances, only a 50 per cent. man in wage-earning capacity. Means must be devised by which suitable occupation could be found for those men and women who had to some extent recovered, whereby they could earn a proper livelihood. Another important question was the isolation of advanced cases. One of the chief means by which a reduction of tuberculosis had been brought about was the fact that the Poor Law infirmaries isolated an enormous number of advanced cases. The infirmary should be encouraged to continue this humane and necessary system of giving comfort and shelter to these afflicted people. There was also the question of sailors; wherever they landed the local authority should have power to give them whatever treatment they might require.

Mr. Trevelyan Thomson hoped that in Committee Clause 1 would be strengthened, for as it was drafted it meant that no matter how inefficient or incomplete an existing scheme might be it was to be deemed adequate after the passing of the bill. Coming to his own experience of work on an Insurance Committee at Middlesbrough, Mr. Thomson said that their funds being so limited they concentrated entirely on early cases, and it was found that 60 per cent. of the patients who had been dealt with were able to resume active work and take their places as physically fit. The advanced cases, notwithstanding that they were ignored, had not increased in number. They found that so far as their limited funds operated, the value of the money spent worked out in these proportions: For every £1 spent on after-care, £2 was spent in the dispensary and £8 upon sanatoriums; in fact, eight times as much value was got for the money spent on after-care as upon other forms of treatment. He appealed to the Minister to extend recognition to convalescent homes, which might not occupy palatial buildings and have a full staff of medical officers and nurses, but which were yielding an excellent return. He hoped, too, that more financial assistance might be given to the local authorities.

Captain Elliot recalled that Scotland had provided the precedent for this scheme—a precedent which had been working for a long time. Quoting the comparative statistics of deaths from tuberculosis and consumption in this country, he thought that a certain amount of the decrease of the last two years was undoubtedly due to the remedial measures introduced by the then Minister of Health, but a large amount of it was due to good trade. He warned all sections of the House—and was sure that every medical man would join in that warning—against the almost inevitable disturbance in our vital statistics which the present industrial crisis would bring about. Our vital statistics were very much better than those of any other country in Europe, and better almost than those of any other country in the world. In 1919 our death rate was 125.8, and in 1920 it was 112.8. In Prague, where the conditions were fairly comparable with those in our own country, the death rate was 386, in the city of Warsaw it was 591, in Vienna 490, and in Cracow 616. We had no special immunity against disease in this country. If we had a starving population, diseases, of which tuberculosis was one, would follow as surely as the rising and setting of the sun. He thought that the scheme of the bill afforded the best method of dealing with the matter. This was by a system of local administration with a grant in aid from a central authority, and it had proved its value in other affairs of public health in the country, as, for instance, in reducing the mortality of children. There was a splendid chance now of dealing with this evil. Influenza had swept out a large number of people who would probably have become acute cases of tuberculosis. Consequently they had a very low number of people in the country to-day actually in acute stages of tuberculosis; they could get it on the run if they could drive the attack home. In regard to after-care, he thought the experience of the Ministry of Labour should be of the utmost value. What was wanted was a sort of disabled men's roll—some sort of national scheme for the reservation of a proportion of places in industry. In this connexion he made a special appeal to the Labour representatives. He suggested also that there should be some sort of a clearing-house system before men were definitely marked off for sanatorium treatment; this would enable the whole medical science to be concentrated on a particular case, and then it could be determined definitely, after some residence in hospital, whether a person needed to start the treatment.

Major Molson hoped that the bill would be passed promptly, and that any great expense in the way of building would be avoided. He was not in favour of elaborate buildings, but of pushing forward to fulfil the pledge given so long ago for the efficient treatment of the great mass of people who needed it.

Major David Davies regretted that there was no financial clause in the bill. He thought it was intended that the financial arrangements which would come up in the Estimates for the Ministry of Health were to be based on the present arrangement. The local authorities paid 50 per cent., or half the deficit, and the remaining half was to come from the Treasury. He urged that the Treasury contribution should be two-thirds.

Major Newman agreed that the measure was necessary, but asked what it was going to cost the tax- and rate-payer.

Dr. Farquharson welcomed the bill, which he took as dealing solely with the question of institutional treatment for tuberculosis. As he read the finance of the bill something more than £400,000 would be available for the purpose. In his view sanatorium treatment at present was nothing more than an experiment. In his opinion the spending of large sums of money on institutional treatment was neither wise nor justified by the results of the past; it was only one of the whole gamut of methods of treatment; it was only one little stage of treatment which often came in, unfortunately, when treatment of any kind was more or less useless. He regarded the sanatorium

as an element of an educational agency, which the Ministry of Health now had at command. The Ministry had a duty more important than merely creating bureaucrats to dispense large sums of money. One fault he found with institutional treatment was that it induced a certain degree of passivity on the part of the patient. The After-care Association encouraged that passivity, when often all that was wanted was to rouse the patient to the knowledge that he was his own keeper, and that by simple attention to hygienic rules he could cease to be a burden upon his fellow men. Referring to the financial statistics of the bill, Dr. Farquharson pointed out that it transferred the onus of the incidence of payment for benefit given. Under the National Insurance Act the benefits derived from institutional treatment were paid for by the employers, by the State, and by the insured person himself, a portion of the contributions being allocated. Under this bill by a stroke of the pen the onus referred to was transferred to the local ratepayer and the income tax payer, the money previously applied for this purpose being absorbed in general insurance benefits. He thought that such financial readjustments should not appear as a side issue. He was opposed to the suggested amendment to compel county councils to co-opt members of committees; that this should be permissive was right and proper. Subject to these criticisms he welcomed the bill as filling up a gap left by the bill of 1920.

Mr. Lane-Fox, Sir W. Joynson-Hicks, Sir F. Blake, Sir F. Banbury, Lieutenant Commander Kenworthy, and Mr. Myers continued the discussion.

Sir A. Mond, in replying on the whole debate, said the total expense of the treatment of tuberculosis was estimated at £2,300,000, of which the Exchequer was bearing £1,300,000 and the local authorities were bearing £1,000,000. Another £100,000 had to be added to the Exchequer expenditure because that was the sum which would come on the Exchequer which was now being borne by the insurance vote. What was now being discussed was £300,000, which was not a fixed amount but an approximate amount. It was the contribution which would have been received from the Insurance Committees by the local authorities. The local authorities were actually receiving from the Exchequer the full equivalent of the amount available in 1920. The sum of £300,000 was to be taken as an estimate. The proper time for discussing the financial aspects of the bill would be on the Estimates. Lieut.-Colonel Fremantle inquired if the proposals of the bill of last year dealing with sanatoriums for soldiers in village settlements would be included in this bill. Sir A. Mond said they certainly would not.

The bill was then given a second reading.

### The Dogs Bill.

One effect of the preoccupation of parliamentary minds with the coal crisis was that, the business of the House of Commons being taken as usual, there was a chance that the bills of private members on the agenda for April 15th must be passed at a rapid rate and without much attention being given to them. The medical group, however, kept a vigilant eye for the Dogs Bill introduced by Sir Frederick Banbury, which was down for second reading as a late order. The withdrawal of various members from the debating chamber at one o'clock ensured a count and an adjournment until half-past three. Then the House received the important statement by the Prime Minister regarding the coal conference and no further business was taken.

*The Medical Staff of the Ministry of Health.*—Sir A. Mond, in answer to Sir T. Fraser, said, on April 13th, that the total number of medical men on the staff of the department (including two part-time specialist officers) was one hundred—namely, sixty-three at headquarters and thirty-seven in regional offices; the salaries of the headquarters on March 31st, 1921, amounted to £51,549 3s., and the war bonus to £31,681, a total cost of £83,230 3s. per annum. The salaries of the regional medical officers, as on March 31st, 1921, amounted to £47,400. The salaries of these officers were inclusive of war bonus. The number of medical men employed by the Local Government Board in 1914 was thirty-one, and their actual salaries in that year amounted to £20,571 15s. 9d. For purposes of comparison, however, the medical staff of the National Health Insurance Commissions (England and Wales) must be added to this, as their functions are now performed by medical officers of the Ministry. In 1914 this staff numbered eight (including the deputy-chairmen in England and Wales), and their salaries totalled £6,300. The total number of medical men in the two departments in 1914 was, therefore, thirty-nine, and the cost £26,871 15s. 9d. Sir W. Joynson-Hicks asked if there was any intention to reduce what was apparently an over-weighted staff to the pre-war number. Lieut.-Colonel Fremantle inquired whether it was not the fact that this staff had always been insufficient for protecting the health of the nation. Sir A. Mond replied that he had not had an opportunity of going into the question, and could not therefore offer any opinion in regard to it.

*Superannuation of Islington's Medical Officer.*—Lieut.-Colonel Fremantle asked, on April 13th, whether the Islington Borough Council was proposing to superannuate their medical officer of health after thirty-nine years' efficient and energetic service (twenty-nine at Islington) at a rate not fixed by scale and far below that usually granted to executive officers. He put it to the Minister that the Superannuation (Metropolitan) Act, 1866, provided for the payment of superannuation at the rate of one-sixtieth of salary for every year of service, and that the Islington Council had adopted the act for superannuating roadmen, scavengers and other labourers. Sir A. Mond said he was making inquiries into the case.

*Public Health Officers (No. 2) Bill.*—This measure was read a second time on April 14th and committed to a Standing Committee. This is the bill introduced by Sir Philip Magnus at the request of the British Medical Association, and is designed to give all medical officers of health and sanitary inspectors security in their tenure of office similar to that enjoyed by Poor Law medical officers, metropolitan medical officers of health, and medical officers of health appointed by county councils.

*Criminal Law Amendment Bill.*—Mr. Chamberlain, replying to Lady Astor on April 12th, said that if he found that the Criminal Law Amendment Bill could be treated as a non-controversial measure the Government would endeavour to facilitate the passage towards the end of the session.

*Encephalitis Lethargica.*—Sir A. Mond, on April 13th, informed Mr. Gilbert that 1,572 cases of encephalitis lethargica had been reported in England and Wales, between April 1st, 1920, and March 31st, 1921. The deaths from this disease during the same period, so far as was known at present, amounted to 495. The disease was made compulsorily notifiable on January 1st, 1919, and since then special reports had been received from medical officers of health on practically all the cases which had been notified, while special inquiries had been made and advice had been given by medical officers of the Ministry in suitable cases. Simultaneously the pathology of the disease was being studied in association with the Medical Research Council.

*Admiralty Surgeons' Fees.*—Mr. Amery informed Captain Elliot that the revised scales of fees for Admiralty surgeons had now been promulgated in a Fleet Order, with the exception of those for medical examinations.

*Bellahouston Hospital, Glasgow.*—In reply to questions by Mr. Maclean, on April 14th, as to allegations against the administration of Bellahouston Hospital, near Glasgow, the Minister of Pensions said that he had called for an immediate report, and that unless the report satisfied him that the allegations were unfounded, he would hold an inquiry into the administration of the hospital forthwith.

*Medical Officers' Pay in India.*—In answer to Lieut.-Colonel Guinness, on April 14th, Mr. Montagu said that the pay of R.A.M.C. officers in India was increased in March, 1920, with effect from July 1st, 1919. Consequent on an increase of pay granted to officers of the Indian Medical Service, with effect from January 1st, 1920, a further increase had been granted to R.A.M.C. officers, with effect from the same date.

*Nurses' Registration Acts.*—Mr. T. Griffiths asked, on April 18th, whether the General Nursing Council for Scotland had so far refused to consult with the English Council before making rules with respect to conditions of admission to the register, as required by the Scottish Act, Section 3, Subsection (3); and, if so, whether he would insist on such a consultation so that the English Council may be in a position to present its rules for his approval, and to open the register under conditions securing a uniform standard of qualification in all parts of the United Kingdom, as provided in the Nurses' Registration Acts. Sir A. Mond replied that he understood that the Scottish Nursing Council had not refused to consult with the English Council; but that, in view of the small number of outstanding points on the rules for the admission of existing nurses to the register, had suggested that the conference should be deferred until the draft rules for the admission of future nurses were ready for discussion. In any case he had no jurisdiction over the Scottish Council, though he agreed that it was important to secure a uniform standard of registration in all parts of the United Kingdom.

*The Dentists Bill.*—Mr. Raffan asked, on April 13th, if it was still the intention of the Government to introduce a measure this session to carry out the recommendations of the Departmental Committee on the Dentists Act. Sir A. Mond said he was afraid that, owing to the congestion of the Government's business, legislation on this subject would not be practicable during the present session. Mr. Raffan recalled that Dr. Addison had promised that a bill should be introduced if there were general agreement, and he asked whether on such assurance the present Minister of Health would reconsider the matter. Sir A. Mond said he had no intention to introduce a bill this session. The programme of legislation was very much upset already, and he was informed there was very little chance of any agreement. He would, of course, be glad to look into the matter again, but he did not know how any group of members could give him an assurance of an agreement, and he was sure that the House did not want an autumn session. He would be pleased, however, to receive representations from members of Parliament regarding the position. Arrangements have been made for a meeting one day next week of the Parliamentary Medical Group and of members of the Incorporated Dental Society to consider what steps can be taken to assist the progress of the bill. Captain Elliot and Mr. Raffan are making the arrangements.

# THE MALE VENEREAL CLINIC AT THE ROYAL INFIRMARY, LEICESTER.

## AN ACCOUNT OF ITS ORIGIN, DEVELOPMENT, AND WORK.

BY

HENRY J. BLAKESLEY, F.R.C.S.,
MAJOR R.A.M.C.T.,

HONORARY CONSULTING SURGEON, LEICESTER ROYAL INFIRMARY; MEDICAL OFFICER IN CHARGE OF THE MALE VENEREAL CLINIC, LEICESTER ROYAL INFIRMARY.

THE clinic for diagnosis and treatment of venereal diseases in the male was opened at the Royal Infirmary, Leicester, on March 2nd, 1917. A portion of the out-patient department was set apart by the board of governors of the infirmary. Certain fixed days and hours were allotted, at which times no other out-patients attended, ensuring as far as possible privacy for patients suffering from or seeking advice regarding venereal diseases. A consulting room, two examination rooms, and an irrigation room fitted with sterilizer, hot and cold water, sink, etc., were available.

As the out-patient department is congested with general medical, surgical, and special work no further time can be allotted for extending the number of hours of the venereal clinics. Plans have been prepared and a new building exclusively reserved for the treatment of venereal diseases will shortly be erected. Complete privacy will be secured and all facilities afforded for the carrying out of all ordinary and special treatment under the most favourable conditions.

About the end of 1917 two small wards, accommodating four in-patients, were provided and equipped by the infirmary authorities for men, completely isolated from the general hospital, and they have been in constant occupation up to the present time.

Two clinics of two to three hours each in duration were held weekly during the year 1917. On January 1st, 1918, three clinics a week were deemed necessary, one of which was reserved exclusively for the treatment of gonorrhoea; and on November 1st, 1919, it was found that the holding of a fourth clinic per week was essential in order to cope with the number of patients applying for treatment, this being more than double that of the preceding year.

During the first year the staff consisted of the medical officer in charge—who personally carried out the whole of the treatment, both general and technical—assisted by an inadequately trained male nurse. About the middle of 1918 one of the resident house-surgeons of the infirmary was allowed to assist at two clinics per week, and his services were utilized to carry out the technical treatment of gonorrhoea. This arrangement obtained until July, 1919, when the largely increased number of patients attending rendered it necessary that the house-surgeon should attend all the clinics. After a few months it was found that his attendance at all clinics so materially interfered with his ordinary duties as house-surgeon that the board of governors, with the approval of the Ministry of Health and the City and County Councils, appointed a fully qualified medical man as part-time assistant medical officer to the Male Venereal Department.

The two medical officers carry out the whole of the work of the department, assisted by a highly efficient male nurse and a well trained hospital porter. In addition to his duties at the clinics the male nurse is in nursing charge of the male venereal wards, and he is on duty from 8 a.m. to 8 p.m. for the carrying out of measures (for the prevention of venereal disease) and the giving of irrigations to such cases of gonorrhoea as apply in the intervals between the hours of the recognized clinics.

### *Summary of Work Done.*

The work done in the three years and four months from March 1st, 1917, to June 30th, 1920, comprises:

1,885 new patients, 628 of whom were suffering from syphilis and 1,052 from gonorrhoea; 205 were found after clinical and bacteriological examinations not to be suffering from venereal disease, and 86 were proved to be suffering from both diseases.

Renewed attendances numbered: In 1917, 2,583; in 1918, 5,021; in 1919, 9,315; and in 1920 (six months), 5,942.

During the ten months of 1917, 287 new patients applied for treatment at the clinic, 97 proving to be suffering from syphilis and 161 from gonorrhoea.

During the year 1918, 360 new patients applied, 121 suffering from syphilis and 210 from gonorrhoea.

During the year 1919, 852 new patients applied, 266 suffering from syphilis and 495 from gonorrhoea.

During the first six months of 1920, 386 new patients applied, 144 suffering from syphilis and 186 from gonorrhoea.

In about 10 per cent. of the totals venereal disease was not proven, and some 5 per cent. were proved to have both syphilis and gonorrhoea.

The marked increase of new patients during 1919 may be attributed to the fact that in that year large numbers of men were demobilized, many of whom contracted venereal disease shortly after resuming civil life, and a considerable number were cases contracted whilst on active service which had been treated but still showed definite signs of active disease. The renewed attendances of patients coming for treatment have increased practically in proportion to the number of new patients.

Throughout the clinic the strictest antiseptic precautions are observed. All patients are enjoined to observe the following general rules of life during treatment:

No alcohol; total abstention from coitus or sexual excitement; care and discretion in dietary; careful attention to action of bowels to ensure free daily evacuation; outdoor and healthy exercise, with specified limitations; avoidance of over-heated and overcrowded places (cinemas, music halls, billiard rooms, etc.); early hours to ensure sufficient rest; general bodily cleanliness and sufficient and warm clothing.

Specimens, such as smears, blood for Wassermann test, serum for examination, spirochaetes, etc., are taken from all patients on admission, and are repeated at short intervals during the course of treatment. All specimens are submitted to the pathologist attached to the infirmary for examination and report, and the clinical treatment is controlled and modified in detail by such pathological report.

### *Treatment of Syphilis.*

The treatment of syphilis, as carried out in the clinic, consists of weekly injections, intravenous injections of salvarsan substitute alternating with intramuscular injections of metallic mercury.

Neo-kharsivan is the substitute now exclusively given, others having been tried and discarded as not proving so satisfactory, and the mercury is given in the form of Lambkin's cream. Ten injections of each constitutes a course. The usual doses given are neo-kharsivan 0.6 gram (making 6 grams in all for a course) for an adult patient of average weight and condition. Smaller doses are given in cases of youth, under-weight, old age, deterioration of arteries, and in the constitutionally feeble. Larger doses, namely, 0.75 gram, and 0.9 gram, are administered to others of more than average weight, height, and robust constitution; and metallic mercury 2 grains, making 20 grains for the course.

In addition to the above, mercury is given internally by the mouth in the form of pil. hyd. c creta grains 2 twice a day.

The gravity method is employed for the administration of salvarsan substitutes, the apparatus consisting of a simple glass container, rubber tubing with glass window, and Bailey's holder and needle. The vein of choice is the median cephalic; Lambkin's cream is given with a Record syringe with a steel intramuscular needle of at least one and a half inches in length. This is given in the buttock, the site chosen being the intercellular tissue between the glutei muscles.

All apparatus employed is sterilized by boiling, a fresh needle which has been immersed in spirit after boiling being used for each injection. The skin is rendered aseptic by tincture of iodine or 2 per cent. watery solution of picric acid. The efficiency of the antiseptic precautions observed is proved by the fact that in 6,236 injections not a trace of sepsis has occurred.

*Treatment after Course.*—At the end of the course as described all treatment is suspended for five weeks, and at the end of that time the blood is taken and a Wassermann test is done. If the result be negative, pil. hyd. c creta grains 2 is given twice daily for one month, and then stopped for one month, at the end of which a second Wassermann test is done. If this also prove negative the pills are repeated for one month, stopped for two months, and a third Wassermann done. Should this also prove negative, the pills are repeated for one month, stopped for two months, again repeated for one month, again stopped for two months, and a fourth Wassermann test is done. Should the patient's blood still remain negative no further treatment is given, but Wassermann tests are performed at intervals of three to six months until after two years from the termination of treatment by injection. If the result of any Wassermann test after the first course of treatment prove positive the patient is given pil. hyd. c creta grains 2 twice a day, and after an interval of two months from the last injection of salvarsan substitute a second course is administered, the dosage being the same, but the number of doses varying according to whether the Wassermann reaction shows a low or high degree of positivity. At the end of the second course the same procedure is followed as after the first. Should any further positive Wassermann occur a third and, if necessary, a fourth course is given.

*Tests of Cure.*—The standard test of cure for syphilis adopted in the clinic is: In cases that commence treatment within two months of the appearance of the primary sore, negative Wassermann tests repeated at intervals, extending to two years from cessation of treatment with the absence of all objective symptoms. In cases commencing treatment after a

longer period than two months from the appearance of sore, negative Wassermann tests repeated at intervals for three or even four years after cessation of all treatment.

*Treatment of Gonorrhoea.*

The methods adopted for treatment of gonorrhoea comprise irrigations, instrumentation, massage, etc., at the clinics, carried out entirely by the medical officer, and home treatment in the intervals of attendance at the clinics by the patient himself, as instructed by the medical officer, together with the administration of suitable internal medication. Every facility and encouragement is given for gonorrhoea patients to attend daily for irrigations, but as practically all patients continue in full work during their course of treatment it is in most cases impossible for them to attend more than once or twice a week, and home treatment by syringe is ordered; all patients are individually instructed in the method to be carried out.

Each patient is provided with a half-ounce glass syringe and a bottle of solution of potassium permanganate, which, when mixed as directed, equals 1 in 4,000. This he is instructed to use in the following manner:

Wash hands; wash penis; pass urine; mix lotion; fill syringe; inject half a syringeful into urethra and retain half minute; inject remaining half syringeful, and again retain half minute. This method of using syringe is repeated thrice, resulting in 2 drachms of the lotion being injected into the urethra (six times at each sitting).

The whole of the above formula is to be carried out three times a day. The patient is further advised to wash the penis with soap and water four or five times a day. In addition he is advised to drink three pints of water daily; abstain from horse riding, cycling, motor cycling, football, and all violent exercise during the acute and subacute stages; observe great care by washing of the hands after each manipulation of the penis, to prevent infection of his own eyes; and take all precautions against conveyance of the disease to others by using separate towels, etc.

During the period March 1917 to June 1920, 14,311 irrigations were given for gonorrhoea, of which approximately 20 per cent. were irrigations of the anterior urethra only, and 80 per cent. irrigations of the anterior and posterior urethra. In addition to irrigation, further methods of treatment in the form of penile and prostatic massage, passage of metal sounds, instillations of solutions of silver compounds, etc., were given when indicated by the objective symptoms in each individual case. Urethroscopic inspection and dilatation with Kollmann's dilator has been practised in a comparatively small number of cases, but owing to the limited periods during which the out-patient department is available, it has been found impossible to apply these methods of treatment to many cases for which it would probably have been beneficial. Autogenous vaccines have been prepared and administered in a few selected cases of chronic gonorrhoea without evident benefit.

*Irrigating Solutions.*—The solutions used for irrigations were pot. permang. in strengths of 1 in 6000 for acute to 1 in 2000 for chronic cases. Solution of oxycyanide of mercury, strength 1 in 2000, and hypertonic saline solutions were also used for chronic cases. All solutions were freshly made and were maintained at a temperature of about 104° F., a thermometer being used to check this.

*Standard of Cure.*—The standard of cure adopted in the clinic for gonorrhoea is: Three negative smears in which neither gonococci nor pus cells can be found, taken at intervals of a month after all treatment has been discontinued, with an absence of all objective symptoms for three months. Such smears having been taken after thoroughly cleansing the glans, prepuce and meatus with spirit, and thorough and careful massage of the prostate for two minutes. The patient is instructed to hold his urine for at least four hours before presenting himself for test.

*Clinical Effects during Treatment of Syphilis.*

In 762 cases diagnosed as true syphilis, 7 cases of dermatitis, 8 cases of jaundice, and 1 of haemoptysis occurred. Of these, 4 cases were admitted to the wards, 2 being cases of jaundice in a severe degree and 2 of general and severe dermatitis. All have recovered. The two cases of dermatitis have given negative Wassermann reactions up to the present date. The remaining cases were trivial, not entailing discontinuance of their employment. They quickly recovered under suitable medical treatment.

*Complications of Gonorrhoea.*

The following complications of gonorrhoea were observed in patients applying for treatment:

Epididymitis, 5; rheumatism, 4; stricture, 4; paraphimosis, 4; acute prostatitis, 2; perineal abscess, 2; warts, 2—total, 23.

The following complications arose during treatment:

Epididymitis, 10; retention of urine, 1.

These figures summarized show that all complications arising both before and during treatment amounted to 3.23 per cent. of cases of gonorrhoea; that the percentage of cases of epididymitis occurring in treated and untreated cases of gonorrhoea amounts to 1.45, whilst cases of epididymitis occurring after treatment had been commenced amount to 0.95 per cent.*

*Comparison of Civil with Military Practice.*

Patients under discipline and control are confined to hospital, and to bed if necessary, thus avoiding the conditions and actions detrimental to recovery, such as alcohol, sexual indulgence, violent exercise, unhealthy surroundings, etc. Nearly all civil patients are compelled by force of circumstances to continue their employment, whether detrimental or otherwise to the course of their disease. Furthermore, whilst military patients are compelled to continue treatment until discharged, out of 1,913 civil patients treated at the Royal Infirmary, no less than 1,035 discontinued treatment voluntarily, and out of this latter number, 303 made less than four attendances at the clinic.

The incidence of attendance is made more difficult in the provincial towns as compared with metropolitan areas by reason of the fact that the workers live and work in close relation with each other, and are known to each other to a much larger extent than in London, where a very large proportion live at a considerable distance from their work, and consequently can attend the provided clinics with greater privacy.

It will be observed that in the foregoing account of the work carried out at the Male Venereal Clinic of the Leicester Royal Infirmary no attempt has been made to show results from the standpoint of cure. This is intentional for the following reasons:

1. The increased and increasing knowledge of these diseases has proved their intractability, and consequently the period of three and a half years is too short to enable one to be dogmatic.
2. Large numbers of patients voluntarily ceased attendance, and it may be presumed that the greater proportion of these did so because all signs and symptoms of their disease had disappeared, though no opportunity was given for further bacteriological examination to verify the fact of recovery or otherwise.
3. The adoption during the past eighteen months of many methods of treatment which have now become recognized as routine practice, which in the early days of the clinic were in a more or less experimental stage, will undoubtedly tend to produce effective results in the near future, but they have not been in operation long enough to warrant definitely reliable statistics.
4. In civil life no means exist of ensuring regular and constant attendance for treatment and examination; by this alone can cure be reasonably expected in the majority of cases.

An extremely gratifying feature of the clinic is the large voluntary attendance of old cases for regular treatment, an attendance which is increasing month by month. Many of the men come long distances, even as much as fifteen to twenty miles, at considerable expense to themselves, both in money for train fares and time, for treatment once a week, and in many cases still more often; whilst large numbers of the cases resident in the town attend every day the clinic is open.

The men rapidly show a very marked improvement in general health, and the clinical and bacteriological signs show very encouraging results, although not yet definite enough to give statistics. The appointment twelve months ago of a permanent assistant medical officer, who is devoting his whole time to venereal work, has been followed by very happy results. As stated above, his services at the clinic are utilized chiefly in the treatment of gonorrhoea, and since his appointment all technical treatment for this disease has been personally carried out by him or by myself. The men attending show their appreciation of our efforts, and the congenial tone which pervades the clinic has been considerably promoted and sustained by the loyal support I have received from Dr. Atkinson, my assistant medical officer, and the lay assistants. I am also greatly indebted to Dr. Atkinson for the collating of detailed figures and other work in the compiling of this paper. If these clinics are to be successful in attracting the continued attendance of patients until they become non-infectious, it will be due to the painstaking application by the medical officers of all technical treatment prescribed and the development of a tone of confidence and privacy.

*In an analysis of 50,000 cases of gonorrhoea published in Dr. Lumb's recent work the total number of all complications was 7 per cent. approximately; of cases of epididymitis, 5.5 per cent.; and of epididymitis after treatment commenced, less than 2 per cent. (1.83).

# England and Wales.

### STREET ACCIDENTS IN LONDON.

THE usual quarterly return has been issued by the Home Office showing the number of accidents to persons or property known to the police to have been caused by vehicles or horses in the streets in the metropolitan area during the year 1920, and stating the number of persons killed. The figures are analysed according to the type of vehicle causing the accident, and the respective quarter in which they occurred. During the year 657 persons were killed, of whom 564 were killed by mechanically-propelled vehicles, 72 by horse-drawn vehicles or horses, and 19 by pedal cycles. Mechanically-propelled vehicles used for trade and commercial purposes were responsible for 216 deaths, private motor cars for 166, omnibuses and tramcars for 120, motor cycles for 33 and motor cabs for 27. The total number of accidents to persons or property during the year was 49,824. Of these more than 18,000 were caused by trade and commercial vehicles of one kind or another and 9,683 by private motor cars. The last quarter of the year was the least fruitful in accidents, fatal or otherwise. The horse, unaccompanied by any vehicle, was implicated in 151 accidents to persons or property, with a toll of three deaths. The traction engine was even less destructive, producing only forty-three accidents and two deaths. Horse-drawn omnibuses and tramcars have blank entries in every column, from which it may be inferred that they are now extinct in the metropolitan area; but the horse-drawn cab is debited with eighty-one non-fatal accidents, and the brougham with 376 accidents and one death.

### LIVERPOOL HOSPITAL FOR CHILDREN.

The report for 1920 of the Liverpool Hospital for Children at Leasowe gives some interesting statistics of results. A criticism which is often passed upon statistics from such a hospital is that they are of little value unless followed by others showing the condition after a considerable period of time of those cases which have been discharged under the heading of "disease arrested." Dr. Hartley Martin, senior medical officer of the hospital, undertook, therefore, to follow up the Liverpool cases after discharge, and in order to do this an after-care clinic, held once a week, was established. Of 84 cases discharged "disease arrested" in 1919, 80 were traced, and of these in January, 1921, 75 were well and 5 had shown recurrence of the disease. Of the 75 cases, which comprised cases of tuberculosis of the spine, hip, knee, and tuberculous osteitis, adenitis, and peritonitis, all but one were either attending school or in healthy employment, none of them being in special homes or workshops for the crippled. Such figures are distinctly encouraging in the treatment of surgical tuberculosis.

### LEICESTER ROYAL INFIRMARY.

This year is the one hundred and fiftieth anniversary of the foundation of Leicester Royal Infirmary, and in the annual report for 1920 the rapid progress of the hospital during the last two decades is surveyed. This year the building of a new wing of the hospital with accommodation for 93 in-patients has been begun; when this is completed the available accommodation will be approximately 400 beds; to accommodate the necessary number of additional nurses a new wing is being added to the nurses' home, containing 66 bedrooms. During 1920 a special orthopaedic department and a new pathological department were opened, so that it is evident that the administration of the Leicester Royal Infirmary is both energetic and enterprising, and has brought the institution well into the front rank of modern hospitals. The report points out how admirably Leicestershire is situated to inaugurate a scheme of medical service such as was foreshadowed in the report of Lord Dawson's committee. The populous centres of the county are, generally speaking, about equidistant from Leicester, and a satisfactory motor ambulance service would quickly link up the county institutions with the county hospital. The board indicates its readiness to consider this important question if the county areas appear to consider the co-ordinated service would be a benefit to the community. In regard to the finances of the year the large part that is played in regard to the financial side of the Leicester Royal Infirmary by its Hospital Saturday Fund is well known, and the report draws attention to the fact that whereas last year this Fund amounted to over £20,000, this year it reaches the total of no less than £32,666. In view of the many difficulties of these times the Board of the Leicester Royal Infirmary must be congratulated on being able to present a satisfactory account of its finances, with no diminution, but rather an increase, of its activities.

### POST-GRADUATE STUDY IN BRISTOL.

In connexion with the University of Bristol post-graduate studies a series of weekly clinical demonstrations will take place, during May and June, at the Bristol Royal Infirmary and General Hospital alternately on Wednesdays from 2.30 to 3.30 p.m. The demonstrations will include medical, surgical, eye, and skin cases, and the fee is two guineas, which will include admission for instruction for one month to all the departments of the clinical institutes included in the University. In addition, other post-graduate facilities are available in Bristol, since qualified medical practitioners may be appointed as clinical assistants in all branches of hospital practice for a period of one or more months, at a fee of three guineas a month; where the practitioners are unable to attend daily for a month they may extend the thirty attendances over any period up to six months. Inquiries and applications for admission should be addressed to the Director of Post-Graduate Studies (Clinical Section), Pathological Department, University of Bristol.

# Scotland.

### STUDENTS' FEES AT GLASGOW.

THE report of the Business Committee of the General Council of Glasgow University, which will be presented to the half-yearly meeting next week, makes special reference to the question of raising the class fees of students. As already announced in this column, the University Courts have agreed that the increases shall, as far as practicable, be uniform in the four Scottish universities, and notice has been given that the new scale of fees will come into operation at the beginning of the October session. The adjustment of the scale of increases in the University of Glasgow is at present under consideration by a committee of the Court. The coming into operation of the new scale will, it is said, raise a serious problem in connexion with the grants made by the Carnegie Trustees towards the payment of students' class fees. "The conclusion can hardly be avoided that there are students taking advantage of the Trust whose circumstances do not warrant assistance being given." The suggestion is made that it might be well to revise the basis of the grants in each faculty, and "unless very strong reason can be given, the benefit of the Trust should not be given to anyone who has not gained the leaving certificate or passed the preliminary examination." At the beginning of the academic year 1920–21 the Business Committee reduced by £1 in each faculty the scale of allocation.

### FERGUSON CHEMICAL LIBRARY.

On the recommendation of the Library Committee, the University Court of Glasgow has decided to acquire the valuable chemical library of the late Professor John Ferguson, who for more than forty years held the chair of chemistry in the university. The chemical section of the library contains, in round figures, 9,300 volumes, 1,400 pamphlets, and 300 manuscripts. In addition to the great number of volumes on alchemy, chemistry, astrology, folklore, etc., and on technical processes, there are works on early medicine and pharmacy, and on spas and mineral waters. Lastly, it should be noted that the library contains some 130 copies of books printed in the fifteenth century.

# Correspondence.

## THE SCIENCE OF ETIOLOGY, OR THE NEW EPIDEMIOLOGY.

SIR,—Since "not inquiring too strictly into the specific differentiae of disease" means nothing more than the study of etiological momenta common to disease groups, Dr. Greenwood is to be congratulated on having cleared up a misunderstanding. As regards the final paragraph of his letter in your issue of April 16th, I would venture to remind him that the problem of causation is assuredly not of less interest to the clinician and to the bacteriologist than to the investigator, however hard-working, who devotes himself to the study of epidemics. Preventive medicine is the pride and aim of us all, and contributions to the growing science of etiology, upon which it is based, cannot be too closely scrutinized.—I am, etc.,

April 17th. THE BACTERIOLOGIST IN QUESTION.

## "ETHANESAL" OR ETHER.

SIR,—I used this new anaesthetic, "ethanesal" (BRITISH MEDICAL JOURNAL, April 16th, 1921, p. 565), recently in a case of hysterectomy. The patient was a nullipara and a good subject for the anaesthesia, which was preceded by a hypodermic injection of morphine gr. 1/6, with atropine gr. 1/150, forty-five minutes before the operation was timed to begin. Anaesthesia was begun with a mixture of chloroform and ordinary ether in equal parts for three minutes and continued with ethanesal on an open mask covered with eight layers of gauze kept covered with a twofold towel. She was ready for the surgeon in seven minutes; the operation did not, however, begin for another five minutes, so that when he began she had been having the anaesthetic for fifteen minutes and was apparently deeply under. During the opening of the abdomen the anaesthesia was satisfactory, but from then onwards I found it very difficult to keep her in a state of real surgical anaesthesia; even by using 1 oz. every five minutes I could not secure quiet breathing and full muscular relaxation, so that after fifteen minutes I changed to ordinary ether, when both these conditions were easily realized and kept for the rest of the operation. My first impression, therefore, of the choice of ethanesal or ordinary ether is that I shall prefer the latter for the following reasons: (*a*) Ethanesal anaesthesia would be too light for abdominal and rectal anaesthesia; (*b*) it would be nearly twice as costly as ether; and (*c*) post-operative vomiting is rarely troublesome with open ether anaesthesia.—I am, etc.,

C. CHARNOCK SMITH, M.R.C.S., L.R.C.P.

Hastings, April 12th.

## EVOLUTION AND DISEASE.

SIR,—Dr. J. T. C. Nash's letter on Evolution and Disease, in the BRITISH MEDICAL JOURNAL for April 9th, is an opportune appeal to biologists, and more particularly to bacteriologists, for greater tolerance towards those who make what Tyndall would have termed a scientific use of the imagination in their dealings with the problems of science.

Intolerance and bigotry are out of place in any department of science, but especially in medical science, whose workers are, or should be, familiar with, and therefore sympathetic towards, the little weaknesses of human nature. Certainly as a class scientific men are less bigoted and more tolerant than any other class, despite the tendency of specialization to produce that type of mind that cannot see the wood for the trees, but now and again they allow the cloven hoof of bigotry and intolerance to appear. Two notable and very relevant examples of this deplorable phase of mind may be recalled. When Professor Tyndall, in his lectures on "Dust and Disease," suggested that atmospheric micro-organisms might be agencies in the production of disease, he excited the wrath and jealousy of medical men, who apparently resented the incursion of the pure physicist into the realms of medicine. In a leading article in the *Lancet* a writer thus fulminated his displeasure:

> "It is lamentable that an eminent public teacher, when speaking on a subject of which he can know next to nothing, should place his opinion in opposition to that entertained by all those who are most capable of judging."

Again, when Charlton Bastian, himself a distinguished Fellow of the Royal Society, submitted to the society a paper dealing with abiogenesis, not only was the paper declined but the particular member of the committee responsible for its rejection flatly refused to look at the specimens Dr. Bastian had brought.

I quite agree with Dr. Nash's general contentions concerning a probable relationship between certain diseases and a faculty of involution and evolution on the part of the causative micro-organisms. In the BRITISH MEDICAL JOURNAL for October 14th, 1905, I published the case of a robust and temperate young sailor who sustained a severe blow over the left side of his chest, and who on the following day fell ill with, and subsequently exhibited all the classic signs and symptoms of, acute pneumonia of the left lung. In this case the coincidence between traumatism and pneumococcal infection was so striking that I ventured the following suggestions, the italics being now inserted:

> "In cases of this nature I incline to the assumption that *an involution form* of the specific pneumococcus finding itself, if I may be allowed the expression, in a favourable environment, to wit, damaged lung tissue, *undergoes a rapid evolution into the higher and more virulent variety* associated with acute pneumonia. This latter variety subsequently either *reverts to the lower and more primitive saprophytic type*, should the host die of the disease, or it succumbs to phagocytosis during recovery (of the host)."

In the following number of the JOURNAL Dr. Frederick C. Forster stated that he had, in the previous seven years, treated five precisely similar cases. Apart from the well-known capacity of certain bacteria to undergo evolution and involution, is it not more than probable that the sudden appearance of new diseases in the past may ultimately be proved to be due to a mutation of some harmless saprophytic bacterium into the parasitic type? Seeing that mutations do occur in the plant and animal world, as amply proved by De Vries in the case of the evening primrose, *Oenothera*, and by Morgan in the case of the fly *Drosophila*, we may reasonably expect them to occur in the bacterial world which was the forerunner of both.—I am, etc.,

C. MARSH BEADNELL, R.N.,
R.N. Hospital, Chatham, April 11th. Surgeon Captain R.N.

## AN OPERATION PERFORMED UNDER DIFFICULTIES.

SIR,—The difficulties besetting an operator, apart from those of a physical or anatomical nature, are usually determined by the time the emergency arises and the place where it occurs. A sudden emergency demands prompt action, and a remote situation precludes any hope of obtaining help or instruments. Two emergencies placed me in the position of having to determine on prompt action without much prospect of success, and an even stronger prospect of a dire result should no action at all be taken.

The first emergency was the movement of troops to a remote place in the Northern Territories of the Gold Coast, in lat. 11.50 N. and long. 0.40 W. The patient was a native clerk's wife, who had accompanied the troops, and not only were the surgical instruments available few in number, but also they were not applicable to the case in question—an incomplete abortion with severe haemorrhage. It was impossible to send for instruments from the nearest station where they were available in time to be of any service, and something must be done. The two emergencies—troops recently moved, with a limited surgical equipment, and the wholly unexpected occurrence of a gynaecological case in that situation—were perhaps unique, and certainly embarrassing.

From the first day I set foot on the Gold Coast I made a point of carrying such tools as a country life had taught me to regard as an irreducible minimum to secure the comforts of life at home, and be independent of the assistance of artisans except on great occasions. Many a time these instruments were of signal service in mending a broken hammock or saddle in the bush, or repairing a leaky bath, or the mainspring of a watch, or gramophone, or even in constructing something entirely new from improvised materials when the necessity arose. It was therefore quite natural to think of making a set of instruments for this emergency, the only serious difficulty being the question of raw or improvised material. At this juncture I had recourse to the assistance of my friend Captain Henry, of the West African Frontier Force, who was then in

command of the troops. He was making his evening tour of the lines, and, on being asked what old metal in his armoury he had likely to be of service, he made a minute search, and I regretted to find everything in such perfect order that the only thing he could produce as "unserviceable" was a piece of very hard steel rod about a quarter of an inch in diameter, which had been part of a Maxim-gun extractor. The armourer was not on duty, so I took away the metal almost convinced that the last ray of hope was now extinct.

Outside the door of my mud hut I stumbled on an empty "sparklet" bulb C size, and picking it up, saw in it the outline of a serviceable curette. Everything was plain sailing after that. The sun was approaching the horizon, but I set to work in good spirits, and soon fitted the bulb to the steel rod, making them fast by drilling through the neck of the bulb and the steel rod which was adamant, and riveting the two together with part of a French nail got out of the lid of a packing case. The sun set and the stable lantern was brought in. Its wire handle seemed full of promise, and was easily detached, straightened out, filed down at one end into a fine sharp point, and finally rebent into the shape of a somewhat unorthodox but thoroughly useful tenaculum, to replace the more elegant vulsellum used in such cases. A Sim's speculum was the next desideratum, and a real double-ended one was evolved from what had once been a biscuit tin. It may have been rude, but at all events its angularities were all beaten off and carefully smoothed with emery paper, while rigidity was secured by judicious soldering. A "Primus" stove here proved invaluable in heating the plumber's bolt. The emergency was not so very urgent as to forbid the furnishing of a flexible uterine sound of approved style, so this was made from three strands of copper wire twisted together, soldered for greater security, and graduated in the conventional manner.

Nature now demanded sleep, and daylight was necessary for further search afield to secure wood for the handle of the curette and provide dilators, which were to be made of wood also. A start was made early next morning, and the dilators were made from branches of requisite thickness cut from a hardwood tree. It was thought that these would not swell much or alter in shape during the process of sterilization. This proved correct, and the complete set of double-ended Hegar's dilators was soon ready. The handle of the curette was made of soft wood from a baobab tree, which happens to be one of the few soft woods in that region, and is quite a feature of the landscape, from its immense size and remarkable shape.

The instruments being now all ready and sterilized, an anaesthetist had to be found, "and hastening slowly" to make more sure of success, one had the good fortune to secure the services of Captain Henry, who again came gallantly to the rescue, and proved as good as an expert on that occasion. The only other assistant was one Adamu Wongara, seconded for hospital duties from the Company, whose virtues had blossomed some time previously, first having come to notice when I was put out of action by illness, and on recovering discovered that he had silently imbibed the principles of wound dressing, without any attempt ever having been made seriously to teach him. His previously recognized value, which recommended him for hospital duties, was his capacity as an interpreter, for he could speak seven languages.

The operation was successful, and I had news about a year later that the patient's next pregnancy was happily consummated by the birth of a son, who must now be about ten years old. The original curette and copies of all the other instruments are to be seen in the Wellcome Museum of Medical History in London. I have gratefully to acknowledge the kind permission of the Under Secretary of State for the Colonies to publish this note, and likewise of the Commissioner of Medical Services, Ministry of Pensions, West Midland Region.—I am, etc.,

Birmingham, March 21st. ALEX. LUNDIE.

## JOHN EVELYN AND MEDICINE.

SIR,—It is refreshing to notice that some of your readers are able to find time from the cares of panel practice to dip into John Evelyn's *Diary*. There was a reference recently in your pages to the conversation he had on December 4th, 1661, with the Duke of York, who affirmed of a woman who swallowed a whole ear of barley, which worked out at her side. The diarist, under date March 24th, 1671, mentions another item of medical interest:

"I saw the chirurgeon cut off ye leg of a wounded sailor, the stout and gallant man enduring it with incredible patience, without being bound to his chaire as usual on such painfull occasions. I had hardly courage enough to be present. Not being cut off high enough, the gangreen prevailed, and the second operation cost the poore creature his life."

It is to be hoped there are many lovers of Evelyn in the medical profession. His courage and humanity in caring for the wounded and sick sailors committed to his charge are astonishing in that indifferent age.—I am, etc.,

Falkirk, April 11th. GEORGE C. STEWART.

## PROSTATIC SYMPTOMS AND THEIR CAUSES.

SIR,—Being an early sufferer myself, I have read with much interest the correspondence on prostatic symptoms, especially the letter from "Senectus." I have exactly the same symptoms he has described—namely, frequency of micturition, sudden urgency, stream small, hesitancy in starting, and in addition I also get priapism at night, subsiding when the bladder is emptied. "Senectus" states that he is much better since he took certain measures. I, and I am sure others, would be grateful if he would state these measures in detail.

As regards causes, for some time I was wrongly fitted with presbyopic glasses, and my bladder symptoms have improved since correct glasses have been given. Even now I think my bladder symptoms are worse when I have to read and write much in the evening by artificial light. It seems to me as if errors of refraction, not properly corrected, and eye-strain, may be aggravating causes.—I am, etc.,

April 11th. ÆT. 53.

## THE HARLEQUIN FOETUS.

SIR,—The interesting notes and photographs of this rare condition recently published in the JOURNAL remind me that the harlequin foetus has hitherto been one of the riddles of pathology. The following theory may, however, be of service in solving the problem.

The harlequin foetus is atavistic. Its curious collodion-like envelope is due to the persistence of the epitrichium, a membrane which, it will be remembered, normally clothes the embryo from the middle of the third to the beginning of the eighth month of intrauterine life. At eight months this layer breaks down and mingles with the sebum to form the vernix caseosa, and in premature children can often be recognized as desquamating, crinkly wisps loosely adherent to the infant's body. Its function is mechanically protective, preventing maceration in the liquor amnii by swaddling the foetus in a cornified waterproof sheet. It is generally displaced by the hair and sebum accumulating beneath it, the sebum eventually usurping its waterproof function. Complete persistence of the envelope causes harlequin foetus, partial persistence means ichthyosis.

Now a persistent epitrichium is normal to many animals, especially to those whose aquatic habits predispose to maceration of the epidermis—frogs and salamanders, for example. Even among mammals (sloths, certain hogs, probably horses also) it persists till birth, while in cats, bears, sheep, oxen, and deer it is only partially shed. Toldt has recorded a fox with dermal scales; Leibreich (Dissert., Halle, 1853) has described a calf with "foetal ichthyosis." So strong, indeed, is this tendency to retain the epitrichium that its occasional occurrence in man is only to be expected.

This theory not only explains the covering of the harlequin foetus, but also the irregular cracks and fissures which traverse it, due to torsion and suggesting the irregular cuticular exfoliation periodically occurring in lizards. It explains also the uniformly negative *post-mortem* results; this is not surprising, for there has probably never been anything to find, the fault being purely local, involving the skin only. The commoner atavisms are always with us—cleft palate (persistent buccal vault of amphibia), hare-lip

(persistent oral cleft of selachian fishes), hypo- and epispadias (persistent reptilian urethra). To these is now added that riddle of dermatology—the harlequin foetus.—I am, etc.,

Manchester, April 13th. GRAHAM RENSHAW.

## BREECH PRESENTATION WITH EXTENDED ARMS.

SIR,—Having read with interest the recent correspondence in the JOURNAL on "Breech presentation with extended legs," it has occurred to me that the following case might be of interest to some of your readers:

At 8 a.m. on April 16th, 1921, I was sent for by a nurse to a case of transverse presentation. The patient, aged 39, was a tall, stout woman, eight and a half months pregnant. She informed me that she had only been pregnant once before, fourteen years ago, when labour was normal in every respect. On examining the abdomen it seemed to me that, although I could not locate the foetal head owing to the large amount of adipose tissue present, the long axis of the child was certainly lying in the axis of the uterus. I was therefore surprised to find on vaginal examination the left hand of the foetus presenting in an os the size of a shilling. There was no doubt about it being a hand. I felt it distinctly grip my index finger, and the nurse had also felt it—hence her diagnosis. The presenting part was so high up that I was unable to identify any other part of the foetus without passing the whole of my hand into the vagina. As the pains were not frequent, I left the patient until 12 noon, when, as only slight progress had been made, I arranged with a colleague to give an anaesthetic at 2.30 p.m., so that I could examine more thoroughly. However, at 1 p.m. the child was born without assistance, the breech being delivered first with both arms extended down the sides of the trunk, the thighs and knees being flexed.

The mother was very big; the pelvis was very roomy and the child was very small, 4¾ lb., so I suppose that these three circumstances combined to cause delivery in this uncommon position. I confess that after my vaginal examination I was inclined to agree with the nurse, and thought that delivery would have to be carried out by internal version.—I am, etc.,

H. GOOCH, M.B., B.S.Lond.

Brentwood, Essex, April 18th.

# Obituary.

## HENRY BARNES, O.B.E., LL.D.McGILL, M.D., F.R.S.E.,

Consulting Physician to the Cumberland Infirmary, and ex-President of the British Medical Association.

THE death on April 11th, at his house in Carlisle, of Dr. Henry Barnes was briefly announced in our last issue. He was born in 1842 near Wigton in Cumberland, and his life was a long record of distinguished service to his profession and in public life. He graduated with honours at the University of Edinburgh in 1864, and settled in Carlisle in 1866; his first public appointment was that of physician to the Carlisle Dispensary, which he held until, in 1873, he was appointed honorary physician to the Cumberland Infirmary. Other appointments and honours too numerous to mention in detail included the presidency of the British Medical Association in 1896, and at the termination of his year of office he was elected vice-president. Perhaps his almost life-long association with the Cumberland Infirmary as physician, member of and chairman of committee, and finally as its president was the chief element in his fine reputation for energy and single-minded devotion. The writer of these few notes of appreciation, inspired by a long and grateful recognition of Dr. Barnes's services, finds it far from easy to speak in moderate terms of his achievements for this institution. His untiring and unswerving devotion for nearly fifty years to the general and financial advancement of the hospital will live perpetually in the minds of his colleagues, friends, and fellow-townsmen. Dr. Barnes's organizing ability was freely expended in collecting funds for the extension and improvement of the building, and his unfailing charm and kindliness of manner, coupled with sound common sense, made him beloved and respected by all with whom he came in contact. Of his work during the war as honorary secretary and treasurer to the Cumberland branch of the British Red Cross Society, which he had been largely instrumental in establishing, it is impossible to speak too gratefully. His unostentatious and quiet manner and unfailing tact at all times marked him as a discerning administrator. It was a matter of pride to his fellow workers that his services should have been recognized in the bestowal by the King of the O.B.E.

Dr. Barnes's public-spiritedness also found scope in his work as magistrate for Cumberland; he was called to the bench in 1889, and was chairman of the Cumberland Ward Justices from 1904. Dr. Barnes was no mean antiquarian and archaeologist; his antiquarian researches were greatly concerned with the Roman Wall of Hadrian. His presidential address to the British Medical Association, "The medical history of Carlisle," together with numerous other writings on medical and archaeological subjects, contain much of historical interest generally and locally. His contributions to scientific literature comprised papers on Roman medicine and practitioners, Roman medical inscriptions in Britain.

Dr. Barnes's retirement from practice by no means curtailed his efforts for the public good; he was of too earnest and sympathetic a heart for his grasp of affairs to slacken, and the time thus gained he unsparingly devoted to the various institutions of whose administrative bodies he was member. In Carlisle, where his life's work was done, and throughout Cumberland his name will ever be pronounced with respect and affection, and his personality sympathetically remembered and honoured as one whose gifts have truly served his country.

His interest in the British Medical Association was life-long, and he was a member of its central council from 1868 to 1900. He was a Fellow of the Royal Society of Edinburgh, and received the honorary degree of LL.D. from the McGill University when he visited Montreal as retiring President in 1897.

Dr. Barnes married in 1873 Miss Emily Mary Barnes, and is survived by his wife and a son and daughter.

The funeral took place on April 15th; the mourners, in addition to members of the family, included many members of the medical profession in Carlisle, Cumberland, and the Border counties. Dr. Livingstone of Dumfries represented the British Medical Association and the Border Counties Branch. The city officials also attended, and the Mayor, speaking for the Bench afterwards, said that during the thirty-four years Dr. Barnes was a magistrate he had been a constant attender at the court, and his judgement and advice were highly valued. A tribute to his memory was paid also by Mr. John Graham on behalf of the solicitors practising in the courts.

## SURGEON-LIEUT.-COLONEL L. MANCHÉ, M.D., Malta.

SURGEON-LIEUT.-COLONEL L. MANCHÉ, M.D., late of the Royal Malta Artillery, died at Valletta, Malta, on February 16th, at the age of 75 years. The late Colonel Manché had been the founder of the Malta and Mediterranean Branch of the British Medical Association, and acted as Honorary Secretary from its formation in 1888 to 1902. He was several times President of the Branch, and at the time of his death he was Vice-President both of the Malta Branch of the Association and of the Malta Medical Association. Up till the end of his life he maintained the keen interest he had always shown in the organization of the local medical body, and in bringing together the naval, military, and civil members of the profession on the island, amongst all of whom he was deservedly popular.

Colonel Manché was the first holder of the Chair of Ophthalmology in the Malta University, and he performed pioneer work in developing the teaching and the practice of the speciality. He established and maintained at his own expense an ophthalmic clinic for poor patients. His great professional ability, his unselfish interest in all matters that affected the welfare of the medical profession and of the general public, and his courteous and charitable disposition were greatly appreciated by all sections of the community, and his death has caused the most widespread regret.

## THE LATE DR. PETER DUNCAN OF CROYDON.

Sir Thomas Barlow, Bt., writes: Peter Duncan was a first-rate student, alert, accurate and thorough in both theory and practice. The same qualities characterized his career as a singularly well-informed and thoroughly equipped practitioner. It was the rarest thing in a consultation for Duncan to have missed anything, and if he had pride in his professional work it was that he took cognizance of the whole man. He never spared himself in

his solicitude for the welfare of his patients, and they knew and appreciated it. Duncan was a loyal colleague and a staunch friend. He never "wore his heart on his sleeve," and, indeed, he had a certain reserve; but now and again his friends were struck by the evidences in quiet ways of his keen and abiding remembrance and of his warm regard. Requiescat in pace!

Dr. Percy J. Duncan writes: In your appreciative memoir of the late Dr. Peter Thomas Duncan you have written that he was a cousin of the late Dr. Matthews Duncan. May I correct that statement and add that the family was an Irish one dwelling in the neighbourhood of Kilkenny. Three sons became members of the medical profession in London—Dr. William Duncan, Dr. Peter Charles Duncan, and Dr. B. Archdekin Duncan—and the subject of your memoir and his younger brother, Dr. William Duncan, were the sons of the first named. There is a cousin still in Ireland, the Rev. Peter Charles Duncan of Kildonagh, the son of the eldest brother of the family. The writer is the second son of the Dr. Peter Charles Duncan referred to above.

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DR. THOMAS LETTIS of Great Yarmouth died on April 9th as the result of injuries sustained three days before, when he was knocked down by a motor car while endeavouring to board a tramcar. Dr. Lettis, who was a member of an old Yarmouth family, was born in 1845. He received his medical education at University College Hospital, and took the diplomas of M.R.C.S. in 1866 and L.S.A. in 1877, graduating M.D.Durh. in 1899. After holding the post of assistant house-surgeon at University College Hospital he returned to his native town to practise. At the time of his death he was consulting honorary medical officer to the Great Yarmouth Hospital and a member of the Great Yarmouth Division of the British Medical Association.

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DR. ARTHUR DENNISON died at Burley, Leeds, on April 6th, aged 52. He was educated at Edinburgh, where, after taking the Scottish triple qualification in 1891, he graduated M.B. and Ch.B. in 1893, and M.D. in 1895. He then went into practice at Burley, Leeds, where he was medical officer and public vaccinator to No. 4 district of the Leeds Union. He took a temporary commission as lieutenant in the R.A.M.C. on October 15th, 1915, and was promoted to captain after a year's service. He saw service in Malta and Salonica as sanitary section staff captain; at the former place illness necessitated his admission to a tuberculosis sanatorium, from whence he only returned to England last Christmas. He took great interest in local affairs, and was the representative of the West Ward on the Leeds City Council for nine years, prior to which he also represented the Headingley Ward on the same body. He was also a former chairman of the corporation sanitary committee. The funeral, which took place on April 9th, was attended by many friends, including members of the health staffs of the Leeds corporation.

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# The Services.

## INDIAN MEDICAL SERVICE.

### CIVIL EMPLOYMENT PAY.

THE following communiqué has been received from the India Office. It is not dated, but was sent to us on April 18th:

1. With effect from January 1st, 1920, the new scales of pay for officers of the Indian Medical Service in civil employment are as follows:

(*a*) The rates of pay for officers of the Indian Medical Service in civil employment, who hold one of the following appointments, are as specified below:

Director-General, Indian Medical Service, Rs. 3,500.
Surgeons-General Rs. 3,000.
Inspectors-General of Civil Hospitals, Rs. 2,750.
Sanitary Commissioner with the Government of India, Rs. 2,500, rising by annual increments of Rs. 100 to Rs. 3,000.
Inspectors-General of Prisons, Rs. 2,300, rising by annual increments of Rs. 50 to Rs. 2,500.
Sanitary Commissioners, Bengal, Bihar, and Orissa, United Provinces, Punjab, Madras, Burma, Bombay, and Central Provinces, Rs.2,100, rising by annual increments of Rs. 60 to Rs.2,400.
Sanitary Commissioner, Assam, Rs.1,950, rising by annual increments of Rs.50 to Rs.2,300.
Principal, Medical College, Calcutta, Rs. 2,350.
Superintendent, Campbell Medical School, Calcutta, Rs.2,350 for a Lieutenant-Colonel and Rs.1,950 for a Major.
Senior Medical Officer, Port Blair, Rs.1,950.
Surgeon Superintendency, Presidency General Hospital, Calcutta, Rs.2,350.
Surgeon Superintendent, St. George's Hospital, Bombay, Rs.2,350.
Superintendent, General Hospital, Rangoon, Rs.2,150.

(*b*) The rates of pay of officers of the Indian Medical Service in civil employment, who do not hold any of the appointments specified in the other clauses of this paragraph, are shown in the following statement:

| (1) (2) Rank and Service. | (3) Pay (Rs. per Month). | (4) Overseas Pay (Rs. per Month). | (5) Total Pay (Rs. per Month). |
|---|---|---|---|
| Lieutenant ... ... ... ... ... | 500 | 150 | 650 |
| Captain: | | | |
| (i) During the first 3 years' service as Captain | 650 | 150 | 800 |
| (ii) With more than 3 and less than 6 years' service as Captain | 750 | 200 | 950 |
| (iii) With more than 6 years' service as Captain | 850 | 200 | 1,050 |
| Major: | | | |
| (i) During the first 3 years' service as Major | 950 | 250 | 1,200 |
| (ii) With more than 3 and less than 6 years' service as Major | 1,100 | 250 | 1,350 |
| (iii) With more than 6 years' service as Major | 1,250 | 250 | 1,500 |
| Lieutenant-Colonel: | | | |
| (i) Until completion of 23 years' total service | 1,500 | 250 | 1,750 |
| (ii) During the 24th and 25th years of service | 1,600 | 250 | 1,850 |
| (iii) After completion of 25 years' total service | 1,700 | 250 | 1,950 |
| (iv) When selected for increased pay | 1,850 | 250 | 2,100 |

(*c*) The rates of pay in columns (3) and (5) of the statement in clause (*b*) are increased by Rs.250 a month for all officers of the Indian Medical Service who hold one of the following appointments:

(i) Professorial appointments, Bengal, Punjab, United Provinces, Madras, and Bombay; (ii) Principal, Lahore Medical College; (iii) Principal, Lucknow Medical College; (iv) Surgeon to Gokuldas Tejpal Hospital, Bombay; (v) Imperial Serologist; (vi) appointments in the Bacteriological Department; (vii) Chemical Examiners; (viii) Deputy Sanitary Commissioners; (ix) Port Health Officers at Bombay, Calcutta, Rangoon, and Aden; (x) Health Officers, Simla, Imperial Delhi, and Delhi Municipality; (xi) Plague Medical Officers; (xii) Deputy Director-General, Indian Medical Service; (xiii) Assistant Directors-General, Indian Medical Service (Sanitary) and (Stores); (xiv) Surgeon to his Excellency the Viceroy; (xv) Police Surgeon, Rangoon; (xvi) Superintendent, Central Lunatic Asylums; (xvii) Superintendent, X-ray Institute; (xviii) Superintendent, Royal Botanical Gardens, Calcutta.

(*d*) The rates of pay in columns (3) and (5) of the statement in clause (*b*) are increased by Rs.200 a month for all officers of the Indian Medical Service who hold one of the following appointments:

(i) First and second Resident Surgeons, Presidency General Hospital, Calcutta; (ii) Resident Surgeon, St. George's Hospital, Bombay; (iii) Surgeons to Their Excellencies the Governors of Bombay, Madras, and Bengal.

(*e*) For Superintendents of 1st class Central Gaols and the second Medical Officer, Port Blair, the rates of pay in columns (3) and (5) of the statement in clause (*b*) are increased by Rs.150 a month.

(*f*) For Personal Assistants to Surgeons-General the rates of pay in columns (3) and (5) of the statement in clause (*b*) are increased by Rs.100 a month.

(*g*) For Superintendents, 2nd class Central Gaols, the rates of pay in columns (3) and (5) of the statement in clause (*b*) are increased by Rs.50 a month.

(*h*) In addition to the above rates of pay, officers of the Indian Medical Service who hold one of the following appointments draw in addition the duty allowances mentioned:

(i) Officers of the Bacteriological Department who are Directors of 1st class Central and Provincial Laboratories, Rs.200 a month; (ii) Officers of the Bacteriological Department, who are Directors of Pasteur Institutes, Rs.100 a month; (iii) Deputy Director-General, Indian Medical Service, Rs.400 a month, subject to a maximum of Rs 2,500 a month for the total pay and duty allowance combined: (iv) Assistant Directors-General, Indian Medical Service (Sanitary) and (Stores), Rs.250 a month, subject to a maximum of Rs.2,500 a month for the total pay and duty allowance combined.

*Note.*—The appointment of Additional Assistant Director-General, Indian Medical Service, will, for the present, continue to grade for the purposes of pay as a Deputy Assistant Director, Medical Services, Army Headquarters.

2. The rates of overseas pay specified in paragraph 1, clause (*b*), apply only to the officers of the Indian Medical Service in civil employment who fall under paragraph 1, clauses (*b*) to (*h*). This overseas pay will be drawn by all such officers who were in permanent service on the 1st December, 1918, and by all such British officers who have joined or may join the service after that date. Such Indian officers who have joined or may join the permanent service after the 1st December, 1918, will not be allowed to draw this overseas pay, unless they are already drawing pay at a higher rate than is admissible without overseas pay, in which case they will continue to enjoy the benefit of that high rate for so long as they would otherwise have done; but they will not receive any further increment until it is due to them under the scales now sanctioned.

3. Exchange compensation allowance is withdrawn with effect from the 1st January, 1920.

4. In bringing officers at present in service on to the revised rates of pay, Articles 156 to 158 of the Civil Service Regulations

will not apply. A personal allowance is, however, sanctioned for all existing incumbents of offices who are drawing a salary greater than that admissible under the scales now sanctioned, so as to bring their emoluments up to the amount now enjoyed. These personal allowances will be absorbed as increments are earned.

5. Subject to the provision in paragraph 4 the initial pay of the scales now sanctioned in the case of an officer who holds an appointment on a time-scale of pay specified in paragraph 1, clause (*a*), will be regulated according to the number of years he has held the appointment permanently, and the broken period of a year of service, which such an officer has put in before January 1st, 1920, will remain at his credit for the next increment.

*Note.*—The rates of pay in paragraph 1, clause (*b*), apply to all appointments held by officers of the Indian Medical Service in civil employ, which are not specified in the remaining clauses of that paragraph. These include, amongst others, the following appointments:—Civil Surgeons; Agency Surgeons; Presidency Surgeons, 1st and 2nd Districts, Bombay; Police Surgeon, Calcutta; Senior Surgeon and *ex officio* Sanitary Commissioner, Mysore Darbar; Medical Officer, Kathiawar, Political Agency; Ophthalmic Surgeon, General Hospital, Rangoon; Medical Officer, Seistan; Director, Medical Department, Bikanir; Medical Officer, Mewar Bhil Corps, Kherwara; Superintendent of Mahableshwar; Superintendent of Matheran; Resident Surgeon, Medical College, Calcutta; Resident Physician, Medical College, Calcutta; Resident Surgeon, Eden Hospital, Calcutta; Resident Medical Officer, General Hospital, Madras; and Assistant Superintendent, Government Maternity Hospital, Madras.

## ROYAL AIR FORCE NURSING SERVICE.

REGULATIONS regarding conditions of service in the Royal Air Force Nursing Service, which was established by Royal Warrant on January 27th, 1921, have now been issued by the Air Ministry. The service consists of a matron-in-chief, matrons, senior sisters, sisters, and staff nurses. Candidates are required to join as staff nurses, and appointments, which are subject to a probationary period of six months, are given to approved persons of British parentage, over 25 and under 35 years of age, who possess a certificate of training for at least three years at a large civil hospital in the United Kingdom. Full particulars of the service and forms of application for appointment may be obtained from the Matron-in-Chief, Air Ministry, Kingsway, London, W.C. 2.

## DEATHS IN THE SERVICES.

Deputy Surgeon-General Oliver Codrington, R.A.M.C.(ret.), who died recently at the age of 82, was educated at the London Hospital, and took the M.R.C.S. in 1858, the L.S.A. in 1859, and the M.D. of St. Andrews twenty years later, in 1878. Entering the army as assistant surgeon on June 13th, 1859, he became brigade surgeon on August 19th, 1885, and retired, with a step of honorary rank, on March 27th, 1886. He served in the New Zealand war of 1864–66, receiving the medal.

Major John FitzGerald Burke, R.A.M.C.(ret.), died recently at Pembroke. He was born at New Quay, County Clare, on June 14th, 1857, took the L.R.C.P. and S.Edin. in 1882, and entered the army as surgeon on August 1st, 1885, attaining the rank of major after twelve years' service, and retired on October 29th, 1902. After his retirement he was employed at Lancaster from 1902 to 1911, and subsequently at Penally; and also during the recent war. He had a long list of war service. He served as a civil surgeon in the Egyptian war of 1882, before entering the army, receiving the medal with the Khedive's bronze star; Burmah, 1885–87, medal with clasp; Ashanti, 1895–96, star; West Africa, Lagos, 1897–98, Sierra Leone, 1898–99; Protectorate Expedition, medal with clasp; and South Africa, 1900, Queen's medal with clasp.

Major William Barbour A. K. Cullen, I.M.S., died of pneumonia at Meerut on March 29th. He was the younger son of the late Deputy Surgeon-General Cullen, A.M.S., born on March 11th, 1881, and was educated at Edinburgh, where he graduated M.B. and Ch.B. in 1903. After filling the posts of assistant house-surgeon at the Chesterfield Hospital and at the County Hospital, Taunton, he entered the I.M.S. as lieutenant on February 1st, 1906, attaining the rank of major on August 1st, 1917. He had a varied experience of the different theatres of war in the past seven years, accompanied the original Indian force to Europe in November, 1914, and served in France and Belgium till November, 1915; in Mesopotamia from December, 1915, to March, 1916; in the Mahsud operations on the North-West frontier of India from May to August, 1917; with the Egyptian expeditionary force in June and July, 1918; and with the Aden field force from July to October, 1918; and was mentioned in dispatches in the *London Gazette* of June 15th, 1916.

Captain Robert Scott Cumming, R.A.M.C., S.R., died in the 3rd British General Hospital at Basra on March 14th. He was the eldest son of the late Robert Cumming, advocate, of Aberdeen, and was educated at the university in that city, where he graduated M.B. and B.Ch. in 1915. Immediately afterwards he took a commission as lieutenant in the Special Reserve of the R.A.M.C. on July 24th, 1915, and was promoted to captain after six months' service. He received the Military Cross on July 26th, 1917.

The King of the Belgians has conferred the decoration of Officier of the Order of the Crown of Belgium upon Wing-Commander Lewis Leister Greig, M.V.O., M.B., R.A.F., in recognition of valuable services rendered in connexion with the war.

# Universities and Colleges.

## ROYAL COLLEGE OF SURGEONS OF ENGLAND.

A QUARTERLY council was held on April 14th, when Sir Anthony Bowlby, President, was in the chair.

The following prizes were awarded: *Jacksonian Prize:* to Mr. Harold Burrows (Southsea) for his essay on the results and treatment of gunshot injuries of the blood vessels. *John Tomes Prize:* to Dr. James Sim Wallace for his work in connexion with the prevention of dental caries. *Cartwright Medal and Prize:* to Mr. W. Kelsey Fry, M.C. (Guy's Hospital), for his essay on the treatment of injuries of the jaws, and the restoration by mechanical means of parts of the jaws lost as the result of injury or removal on account of disease.

The subject selected for the Jacksonian prize for the year 1921 is the effects produced by radium upon living tissues, with special reference to its use in the treatment of malignant disease.

The subject for the next Cartwright prize for 1921–25 is: Variations in the form of the jaws, with special reference to their etiology and their relation to the occlusion of the dental arches.

Mr. Kenneth Owen Parsons was appointed Bigley student for the ensuing three years.

Professor Charles Scott Sherrington, P.R.S., and Sir S. Squire Sprigge, members of twenty years' standing, were elected to the Fellowship.

Mr. Raymond Johnson was elected to represent the College in the University of London.

## CONJOINT BOARD IN SCOTLAND.

THE following candidates have been approved at the examination indicated:

FINAL EXAMINATION.—*Medicine:* A. Shakur, J. L. Lloyd-Jones, V. H. L. Anthonisz, W. B. Stott, W. Campbell, R. N. Nanda, A. Y. Khan. *Surgery:* J. S. A. Rogers, O. P. Fox, W. B. Stott, R. N. Nanda. *Midwifery:* A. Shakur, J. L. Lloyd-Jones, J. R. Williams, O. P. Fox, J. Pedris, E. P. Dewar, A. Y. Khan. *Medical Jurisprudence:* Enid A. Williams, T. T. Hoskins, G. H. Dobbin, M. S. Hassen, P. G. Bainbridge, D. R. Nicol, J. L. Lloyd-Jones, Rachel Caplan.

The following, having passed the Final Examination, were admitted L.R.C.P.E., L.R.C.S.E., L.F.P.S.Glas.:

Helen Worthington, D. R. Cilliers, N. M. D. Fox, D. J. H. Ferdinando, J. Murray, A. J. Vakil, A. A. Hamilton, A. B. Taylor, R. E. Hopton, J. I. Coventry, R. G. Clouston, P. F. Fairley, S. D. de Vos, B. S. Jain, F. X. H. Hayes, J. J. L. McDonald, F. L. A. Gace, G. H. Thomas, K. A. Doodhar.

## LONDON SCHOOL OF TROPICAL MEDICINE.

THE following candidates have passed the examination of the school at the termination of the sixty-fifth session, January–April, 1921:

*C. T. Maitland (Duncan Medal), *H. R. S. Richards, *A. Crawford, *Miss M. M. Ross, *R. G. Simpson, *J. O. Beven, *W. M. Howells, J. M. Wallace, J. Segal, O. M. Banhawy, D. N. Gore, P. Parthasarathy, M. Morrison, L. M. Sen, B. K. Ray, J. C. Rowan, H. Smith, Miss A. Shaw, D. S. Scott, R. A. W. Procter, Miss A. M. Mackay, J. C. Coetzee, K. A. Gandhi, C. L. Bahni, N. S. Ketwall, F. X. Costello, K. C. Chong, S. Miller, Surgeon Lieut. Commander P. N. Button, Miss M. Jervis, A. R. McLean, Miss L. J. Murphy, A. R. Jennings, Miss M. J. Ahern.

* With distinction.

# Medical News.

THE King has been pleased, on the recommendation of the Home Secretary, to appoint Dr. Sidney Reginald Dyer, Medical Inspector of Prisons, to be a Commissioner of Prisons. Dr. Dyer was formerly medical officer of H.M. Prisons, Stafford, Wandsworth, and Buxton, and was called to the Bar at the Middle Temple in 1896.

THE Prince of Wales (President of the hospital) will take the chair at the annual meeting of the Court of Governors of the Hospital for Sick Children, Great Ormond Street, on Tuesday, May 3rd, at 4 p.m.

THE Minister of Pensions has appointed Dr. A. E. Knight, Commissioner of Medical Services, to hold the combined post of Regional Director and Commissioner of Medical Services in the Ulster Region of the Ministry.

A PARLIAMENTARY White Paper issued recently states that the total receipts paid into the motor taxation account by the local authorities down to March 7th was a little over seven million sterling. The number of cars taxed on horse-power, which would include all ordinary private and professional cars, was 202,000, and the yield was £2,810,800. Commercial cars and lorries yielded half a million less. Motor cycles numbered 186,000, and yielded £488,600. There were two hundred mechanically driven bath chairs, yielding £50 in taxes. It appears that nearly all the licences taken out are for the whole year. The reply to a question in the House of Commons shows that by the end of March the total receipts had increased to seven million and three-quarters.

A SPECIAL meeting of the Fellows of the Royal Society of Medicine will be held on Monday next, at 5 p.m., to consider a recommendation of the Council that the subscription of all Fellows in the London postal area should be raised to five guineas and that for Fellows residing elsewhere in the United Kingdom to four guineas. In addition it has been arranged to reduce the cost of the *Proceedings* by using cheaper paper and smaller type. It is proposed that the subscription paid by Fellows living abroad shall remain three guineas.

MR. ARTHUR CHEATLE will give a lantern demonstration on "The cellular development in the temporal bone" at the opening of the summer session of the Central London Throat and Ear Hospital, Gray's Inn Road, on Wednesday, May 4th, at 4 p.m.

THE fifth annual celebration of National Baby Week will be held from July 1st to 7th, 1921. The chairman of the executive committee is Dr. Eric Pritchard; the honorary secretaries are Mrs. H. B. Irving and Mrs. Sloan Chesser, M.D., and the secretary Miss M. S. Gray. The office is at 5, Tavistock Square, W.C.1.

As the Industrial Welfare Society receives continual requests from firms for definite aid in the application of the principle of industrial welfare to their particular needs, the society has organized itself for this purpose. In addition to the headquarters staff in London and the local branches under the direction of district organizers, a working arrangement in regard to special subjects bearing upon industrial welfare has been made with the appropriate societies and experts both in this country and abroad. The headquarters staff is available for the discussion of conditions and the suggestion of schemes of industrial welfare for different industries, and it sends speakers to address gatherings on subjects kindred to its object. It will assume complete responsibility for the carrying out of welfare schemes, or it will recommend qualified directors. The society also advises on general health problems affecting various industries, and on the establishment of holiday and convalescent centres in industrial districts. There is little doubt that this propaganda work is best carried on by a voluntary society rather than it should be cramped by the rules and regulations within which a Government department would have to work. The offices of the Industrial Welfare Society are at 51, Palace Street, London, S.W.

AN English-speaking conference on infant welfare will be held, under the auspices of the National Association for the Prevention of Infant Mortality and National Baby Week Council, at the Kingsway Hall, London, on July 5th, 6th, and 7th, with Viscount Astor as president. The chief subjects under discussion will be: residential provision for mothers and babies; inheritance and environment as factors in racial health; and the supply of milk, its physiological and economic aspects.

THE annual meeting of the Medical Mission Auxiliary of the Church Missionary Society will be held in the Queen's Hall, Langham Place, London, W.1, on Wednesday, May 4th, when the chair will be taken by Colonel A. Carless, C.B.E., M.S., at 7 p.m.

THE National League for Health, Maternity, and Child Welfare has just issued its report for the year 1920. This League is a federation of ten different societies which deal with various aspects of the questions included in the title. From the report it is evident that a great deal of work is being carried out in every part of the country by the different sections of the League, and by the co-operation of these sections overlapping of the activities is prevented. During the past year five maternity hostels and twenty-six ante-natal clinics have been established by the aid of the League, and under its auspices are carried on a babies' hotel and nursery training school at Stoke Newington, a convalescent home for mothers and babies at Shooters Hill, and a holiday home, formerly at Henley and now to be re-established at Maidenhead.

AT the meeting of the Société française d'oto-rhino-laryngologie in Paris, on May 9th, Drs. Moore and Hautant will read a paper on the radiotherapy of malignant tumours in oto-rhino-laryngology, and Dr. Lemaitre will discuss the orbito-ocular complication of sinusitis.

A MEETING of the Society of German Laryngologists and of the German Otological Society will be held at Nuremburg on May 12th to 14th, under the presidency of Dr. Boenninghaus and Dr. Rudolf Panse of Dresden, when the organization of a school otological service will be discussed.

THE Vienna Medical Society has elected Dr. Ferrière of Geneva and Mr. Hoover of Washington honorary members in recognition of their services to Austria.

DR. EDWARD WALFORD, who has resigned the post of medical officer of health for the city of Cardiff, has been granted by the city council a pension of £500 per annum. Dr. Walford has been M.O.H. of Cardiff since 1888, and as his predecessor, Dr. Paine, held office from 1847 until his appointment, Cardiff must be one of the very few cities in this country—if not the only one—in which only two medical officers of health have held office.

The Conjoint Board of Scientific Societies has decided to discontinue the publication of the Annual Calendar and Fortnightly Bulletin of Scientific Meetings (Diary of Scientific and Technical Societies) owing to the heavy printing liabilities incurred.

THE mortality of illegitimate infants in 1919 in England and Wales was a little over twice as great as of the legitimate. It was particularly heavy from gastro-intestinal disorders. The Affiliation Orders Act of 1914 permitted the appointment of a collecting officer, whose duty it is to see that the mother of an illegitimate child receives an adequate sum for its maintenance from the father. The Bastardy Bill, which it is hoped may be reached in the House of Commons on Friday next, April 29th, would make the clerk to the justices (or the chief clerk of a metropolitan police court) the collecting officer, but would permit him to delegate his powers. The bill would raise the maximum contribution from the putative father from 10s. weekly to 40s.; it would also legitimatize a child born out of wedlock if the parents subsequently intermarried. The bill as originally drafted was a very much more ambitious measure; as it now stands, and regarding it only from the public health point of view, we consider that it deserves support. Its most important point is the power it would give to the magistrates to increase the weekly allowance. The high mortality among illegitimate infants is probably in the main due to the fact that the mother must put it out to nurse either altogether or during the day in order to earn a living.

# Letters, Notes, and Answers.

*As, owing to printing difficulties, the* JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*: telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediocra, Westrand, London*; telephone, 2630, Gerrard.

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*: telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

## QUERIES AND ANSWERS.

WE are asked what steps a V.A.D. nurse, who wishes to train as an assistant in a pathological laboratory, should take.

"MEDICUS" writes: An old patient, who wears an artificial eye, asks how the discoloration and dulling from use can be removed? Would any acid or other chemical effect this without damaging the glass? The makers charge a guinea or more to repolish an artificial eye.

*** The repolishing and colouring of an artificial eye is not a piece of work that can be safely undertaken by an amateur. It needs much skill and long practice, with a full knowledge of the complicated art of glass enamelling. The cost of the work indicated in the inquiry is high, and estimates should be sought from some of the larger firms that specialize in this work—for example, Messrs. Halford, 41, Upper Tollington Place, London, N. 4; Messrs. Taylor and Miller, 8, New Oxford Street, London, W. 1, or Messrs. Maw, Son and Sons, Aldersgate Street, London, E.C.

### INCOME TAX.

"SIMPLICITAS" asks what is the method of dealing with partnership profits.

*** The average profits of the practice are ascertained—that is, the gross receipts (or bookings less allowance for bad debts) less the expenses incurred in the working of the practice for the past three years. This "average" sum is assessed on the firm, but the appropriate allowances for the individual partners are deductible therefrom. The tax is payable by the firm in law, but in fact it is usually shared between the partners on the basis of their individual shares, the inspector of taxes supplying the necessary figures on request. Income tax is payable in two instalments—that is, on January 1st and July 1st, in respect of the income for the year ending April 5th, whether that income has been received in cash or not.

"MEDICO" has been carrying on a general practice, and, to a more limited extent, a specialist's practice elsewhere. He has sold his general practice, and proposes to reside near, and devote his whole time to, his specialist's practice. How will he then be assessable?

*** On the basis of his past three years' receipts from, and expenses in connexion with, the specialist's practice only. The expense of removal will not be an admissible deduction.

"F. R. I. P. H." asks for advice as to the following car purchases and sales: (1) Car A, 12/16 h.p., second hand, bought August, 1919, for £525 and sold for £415; (2) car B, small second-hand car, bought February, 1920, for £220, and still retained; (3) car C, bought August, 1920, 10.5 h.p., new, for £550.

*** The difficulty is that the cars are so dissimilar. Assuming that car A (in the condition in which it was bought) would have cost £525 in August, 1920, the amount of deductible expense is £525 less £415=£110. The purchase of an additional car does not give rise to a claim for expenses, but if cars B and C were sold and a car superior to either were bought our correspondent could then claim that the whole of the net cost could be allowed—that is, the two smaller cars could be reckoned as equivalent to a single new car of higher power or quality.

"A. B. C." inquires whether income tax is payable on "temporary half-pay granted on account of a disability caused by the war."

*** Primâ facie a "disability pension" is exempt and "half-pay" is chargeable. We should like to be clearer on the facts before giving a categorical reply. Can the Government grant temporary half-pay "on account of a disability"? We suggest that "A. B. C." might ascertain the precise subhead of the War Office Vote to which the payment is charged. It may, of course, be a disability pension measured in terms of half-pay.

"EXPECTANS" inquires as to the method of dealing with 4 per cent. tax compounded interest on the Government 1929-42 Stock.

*** It should not be returned "for assessment," but should be included in any declaration of *total* income being shown separately and marked "tax compounded." On the figures given by "Expectans," and assuming that he is a married man, the tax payable by him would be as follows:

| | £ | s. | d. |
|---|---|---|---|
| Earned income, less 10 per cent. ... ... | 810 | 0 | 0 |
| 5 per cent. War Loan interest ... ... | 150 | 0 | 0 |
| Assessable income ... ... ... ... | 960 | 0 | 0 |
| Deduct personal allowance... ... ... | 225 | 0 | 0 |
| Taxable income ... ... ... ... | 735 | 0 | 0 |
| Tax payable—£225 at 3s. ... ... ... | 33 | 15 | 0 |
| £510 at 6s. ... ... ... | 153 | 0 | 0 |
| | 186 | 15 | 0 |

The income on the 4 per cent. stock is not "taxable," as the tax is compounded.

## LETTERS, NOTES, ETC.

THE medical officer of health for the Port of London, Dr. W. M. Willoughby, reports that since the campaign was instituted twenty years ago 1,169,692 rats have been destroyed in the docks and on vessels arriving in the port.

### EFFECT OF GUNSHOT WOUND ON SKULL.

"CORONER" writes: The following case may be of interest to your readers, showing the necessity in all cases of a gunshot wound for a *post-mortem* examination to prove accurately the entrance and exit of the bullet, and also the effect of cordite powder in not producing scorching or burning at the entrance.

A young officer was shot dead in a barrack room, one other officer being in the room with him. There was on the side of the skull, just behind the left ear, a very small wound which the two surgeons who examined the body in the first instance diagnosed as the entrance wound. In a parallel line across the skull there was a wound behind the right ear, showing bleeding and laceration, and an aperture considerably larger than on the left side. This was diagnosed as the exit wound. If the first diagnosis had been correct, the automatic revolver which had been used must have been held in a straight line behind the left ear—an almost impossible position for a right-handed man. The skull was opened and the bone of the skull very carefully examined; both surgeons were convinced that the first diagnosis was wrong. The evidence from the splintering of the bone, and the way such splinters had been carried into the skull, showed that it was the large wound on the right side which was the entrance wound, and the very small wound on the left side the exit. The next point was that there was no apparent singeing, although the evidence was that the deceased held the revolver close to his head. The revolver was an automatic, carrying a 0.22 cartridge, and the powder was alleged to be cordite. A sheep's head was obtained, and a rabbit's skin tightly stretched over this head. Several shots were fired from the revolver into the head, and it was proved that, firing the revolver two inches from the head, there was no discoloration or scorching of the hair on the rabbit's skin, and the fracture of the bones of the sheep's head, where the bullet passed through, corresponded to that of the bones of the skull of the deceased—namely, a considerable wound, and fracture where the bullet entered, and a very small wound hole where the bullet came out.

The generally accepted theory appears to be that the exit wound is always larger than the entrance. This theory is evidently unreliable, and had it been accepted in the case herein referred to, the other officer in the room would have been charged with murder.

### TERMINOLOGICAL CONFUSION.

THE REV. J. O. H. CARTER, M.A. (Slymbridge Rectory, Glos.), writes to suggest that in discussions with regard to venereal disease confusion would be avoided by using "*prophylactic*" for prevention of disease *ante factum*, that is, before the sexual act, and "*metaphylactic*" for prevention of disease *post factum*—after the act.

### BRITISH OPHTHALMIC HOSPITAL, JERUSALEM.

THE British Ophthalmic Hospital in Jerusalem is a hard-working charitable institution which is carried on by the Order of the Hospital of St. John of Jerusalem in England, Lieut.-Colonel J. C. Strathearn being the chief surgeon. Since the war a considerable amount of restoration has had to be done, and extension of the out-patient department is still necessary. The report for 1920 shows, however, that the work of the hospital is now rapidly approaching—and, in some items, such as the number of operations performed, actually surpassing—the average of the years immediately before the war.

### A CORRECTION.

DR. J. A. HADFIELD (London) writes: May I correct an error that has crept into print in the advertisement of the lectureship in psychotherapy at Birmingham University? I am there wrongly described as lecturer in psychotherapy at King's College, whereas my position is the more humble one of lecturer in psychology. The error has naturally given rise to some misapprehension.

### VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 29, 32, 33, 34, 35, and 36 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 30, 31, and 32.

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THE appointment of certifying factory surgeon at Lyneham (Oxford) is vacant.


## SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

| | £ | s. | d. |
|---|---|---|---|
| Six lines and under ... ... ... ... | 0 | 9 | 0 |
| Each additional line... ... ... ... | 0 | 1 | 6 |
| Whole single column (three columns to page) | 7 | 10 | 0 |
| Half single column ... ... ... ... | 3 | 15 | 0 |
| Half page ... ... ... ... ... | 10 | 0 | 0 |
| Whole page ... ... ... ... ... | 20 | 0 | 0 |

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.